

LESSONS FROM THE IMPLEMENTATION

OF RRI in Universities
and Scientific
Institutions



FUNDING

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 664932.



NUCLEUS

The NUCLEUS Consortium

The wide range of international and professional perspectives brought together by the NUCLEUS consortium is one of the project's greatest strengths. The 24 partner organisations represent 14 countries and 3 continents, and include universities and research institutions, national science and technology associations, public policy organisations, national public engagement networks, and non-governmental organisations.



wissenschaft • im dialog

This document has been prepared by the Nucleus Communication team, Leane Regan and Daniela Martin with contributions from, and in collaboration with, our Embedded and Mobile Nucleus partners, and Dr Peter Broks.

Table of contents

INTRODUCTION	04
---------------------	-----------

PROJECT TIMELINE	06
-------------------------	-----------

EMBEDDED NUCLEI CASE STUDIES

This document aims to provide a brief summary of how the NUCLEUS Consortium partners, through our Embedded Nucleus have approached the implementation of Responsible Research and Innovation in their respective institutions and how our Mobile Nuclei have facilitated public engagement in local communities across Europe and China.

The case studies presented in this document do not represent all the efforts of the Embedded Nucleus, moreover they aim to reflect the most enduring activities or outcomes as experienced by each of the Embedded Nuclei leaders and their teams.

CHINA: INSTITUTE OF WETLAND RESEARCH	08
---	-----------

FRANCE: UNIVERSITY OF LYON	10
-----------------------------------	-----------

GEORGIA: ILIA STATE UNIVERSITY	12
---------------------------------------	-----------

GERMANY: RHINE-WAAL UNIVERSITY	14
---------------------------------------	-----------

GERMANY: RUHR - UNIVERSITY BOCHUM	16
--	-----------

MALTA: UNIVERSITY OF MALTA	18
-----------------------------------	-----------

NETHERLANDS: UNIVERSITY OF TWENTE	20
--	-----------

SERBIA: MISANU	22
-----------------------	-----------

SOUTH AFRICA: SAIAB	24
----------------------------	-----------

UK: NOTTINGHAM TRENT UNIVERSITY	26
--	-----------

MOBILE NUCLEI	28
----------------------	-----------

POLICY BRIEFS AND VIDEO LINKS	32
--------------------------------------	-----------

PUBLICATIONS AND PRESENTATIONS	33
---------------------------------------	-----------

INTRODUCTION



At the heart of the NUCLEUS project is the idea that RRI functions in the same way as cells in an organism. The aim has been to develop and nurture a productive 'metabolism' that integrates all these cells, fostering RRI processes which can respond to diverse needs, values and socio-cultural environments.

Productive relationships require open communication and respect for values, expectations and goals – and the relationship between research and society is no exception.

Responsible Research and Innovation (RRI) is a process in which stakeholders – such as researchers, citizens and policy-makers – work together to align research and innovation with the values, needs and expectations of society. Engaging with a range of stakeholders and working throughout the entire process of knowledge and value creation, RRI aims to address grand societal challenges in a more inclusive way.

NUCLEUS was a four-year Horizon 2020 RRI project that aimed to develop a New Understanding of Communication, Learning and Engagement in Universities and Scientific institutions. Its main goal was to implement this understanding by embedding RRI into the governance and culture of research institutions across Europe, China and South Africa.

In order to achieve a new understanding of innovation, public engagement, creativity and learning, RRI requires new structures and formats, as well as training and support for scientists and stakeholders – both inside Higher Education Institutions and in the public sphere.

Through a team of people – our Embedded Nuclei – the NUCLEUS project tested the principles of RRI through real-time experiments in 10 research institutions across Europe, and in South Africa and China. These experiments, shaped by our empirical research, involved implementing approaches and activities that would help to overcome institutional obstacles and demonstrate the benefits of RRI to each institution.

Ultimately, NUCLEUS aimed to develop practical recommendations for research leadership teams on how to implement RRI in their institutions. The true success of the project will be realised through the Living Network of partners committed to sustaining the principles of RRI beyond the life of the project.

The project also supported the activities of 20 Mobile Nuclei, one-off activities where participants in the consortium

tested innovative approaches to reflect the concept of RRI in different contexts.

This document describes the progress of the project to June 2019 through brief cases studies drawn from interviews with our contributing partners and collaborators and is supported by an extensive body of information in the form of publications, formal deliverables, videos and blog posts available via the Nucleus website.

The case studies presented here do not represent all the efforts of the project, moreover they aim to reflect the most enduring activities or outcomes as experienced by the Embedded Nuclei leaders and their teams.

A key expectation of the project was that it would develop recommendations for higher education and research organisations on how to institutionalise, or 'embed' RRI in the culture and governance of these organisations. These recommendations had not been finalised at the time of printing. Detailed implementation recommendations are expected in July 2019.

SHARED GOALS OF THE EMBEDDED NUCLEI

- Build institutionalised bridges between the research community, stakeholders and the general public.
- Catalyse ongoing debates about the role of research in open societies.
- Develop, nurture and support new forms of transdisciplinary research, including RRI principles, in the scientific community.
- Stimulate co-responsibility of all actors involved in the process of research and innovation.
- Question and redefine prevailing notions of "recipients" and "agents".



Members of the Embedded Nuclei team, October 2018 © NUCLEUS Project

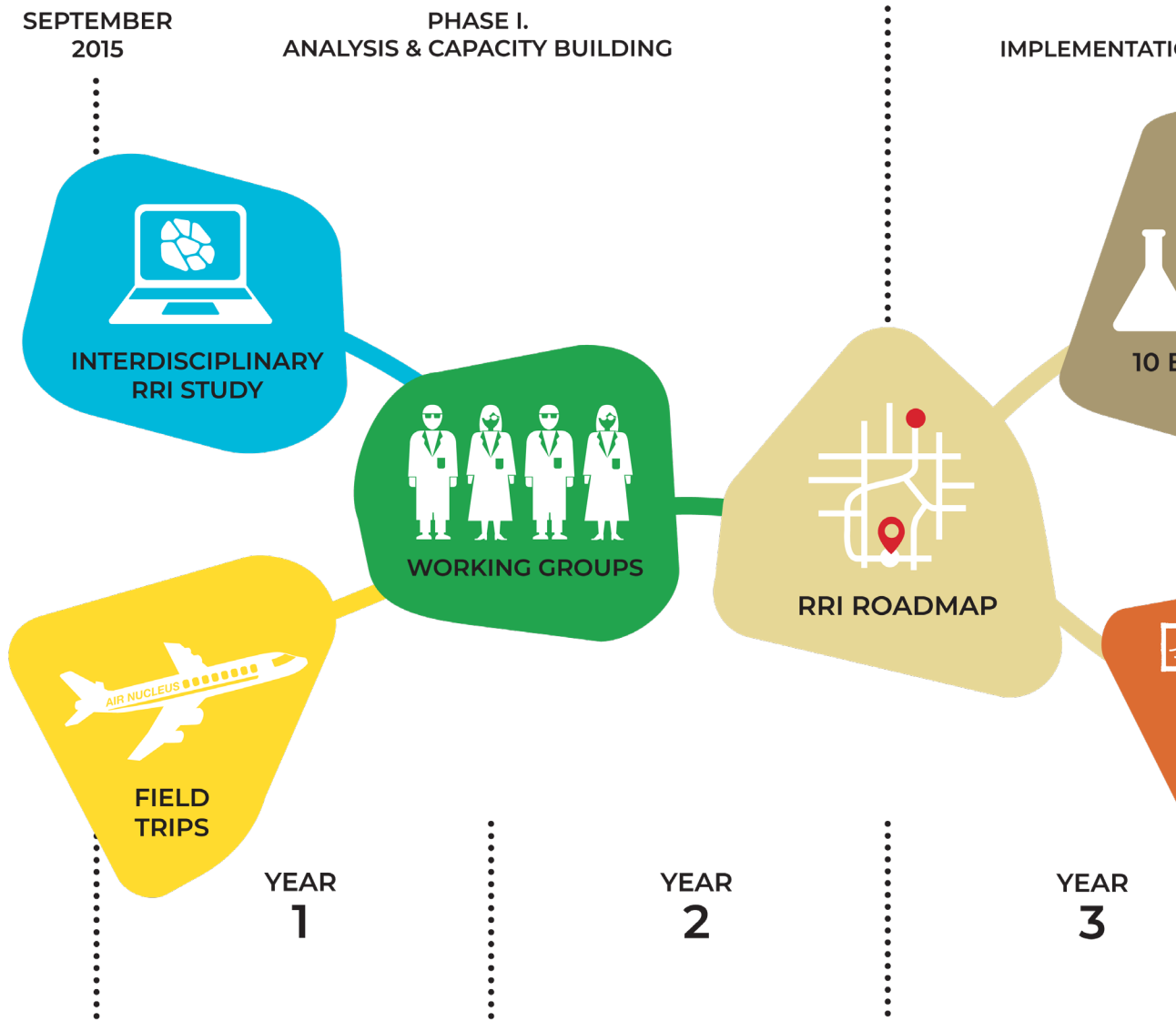
NUCLEUS TIMELINE AND CASE STUDIES



NUCLEUS

BRINGING RRI TO LIFE

The NUCLEUS project had a four-year timeline that covered four stages: the analysis and capacity building through field trips and cross cultural studies, the development of an Implementation Roadmap for RRI, the implementation of such a Roadmap, and an evaluation of the Roadmap’s performance in practice.

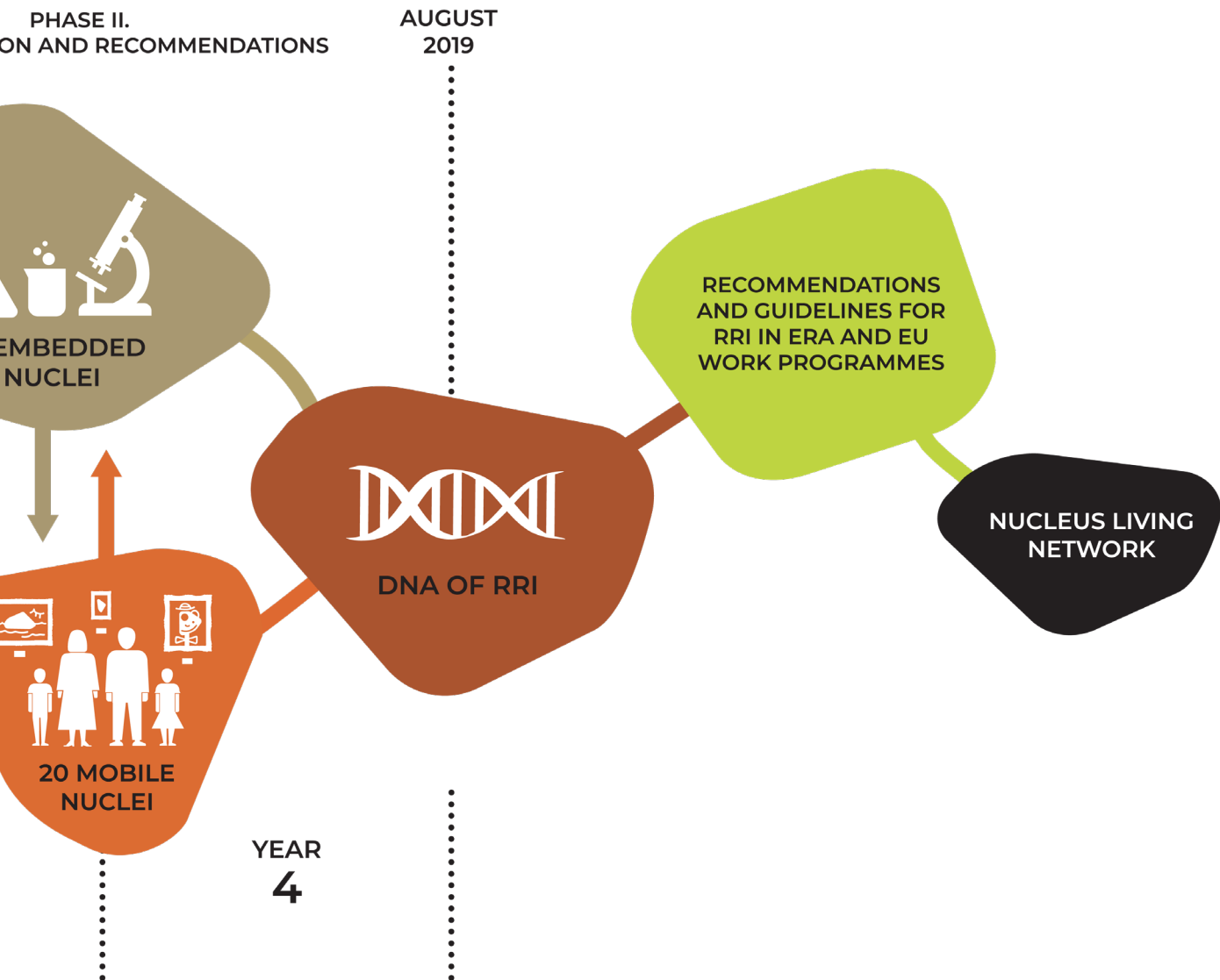


LAYING THE GROUNDWORK FOR RRI

Field trips investigated the barriers to RRI and the opportunities specific to six different stakeholder groups: the media, the economy, public policy, public engagement, civil society and research institutions. **A cross cultural study and interviews** with nearly 100 researchers and research leaders uncovered trends in attitudes towards RRI in academic environments.

RRI ROADMAP

The **findings and recommendations** from the first two years were consolidated into an **Implementation Roadmap** which helped partnered universities develop their Embedded and Mobile Nuclei and navigate towards RRI.



IMPLEMENTATION PHASE

Ten universities and research institutes hosted an **Embedded Nuclei**. These were dedicated units working to establish RRI in the culture and structures of their institutions with support from project mentors.

Twenty partners representing Universities, science festivals and museums acted as **Mobile Nuclei**. These partners integrated modular activities into existing events to support the uptake of RRI by a wider audience.

THE DNA OF RRI & A LIVING NETWORK

Practical recommendations for research leaders on how to implement RRI became the **DNA of RRI**, shaping the growth of a Living Network of partners committed to sustaining RRI beyond the project's lifetime.

CHINA

INSTITUTE OF WETLAND RESEARCH



Visiting a wetland with NGO volunteers © IWR

Situated in Beijing, China, the Institute of Wetland Research (IWR), Chinese Academy of Forestry is at the forefront of wetlands research in China. IWR is a cross-disciplinary research institute that encourages academic communications within and outside the institute. As a government-affiliated institute, IWR has a strong relationship with central and local government with its research informing policy and management decisions, particularly with regards to the management and restoration of wetlands.

The Institute places a strong emphasis on innovation through scientific literacy and popularisation of science and technology, making it an ideal organisation in which to test some of the RRI practices suggested through the NUCLEUS project.

The Nucleus team have engaged many publics throughout the project, from hosting major science communication events involving the media, schools, and broader communities during the annual World Wetland Day, to delivering RRI training workshops for IWR researchers.



The design process for science popularisation products © IWR

“NUCLEUS shows a creative way of doing research by integrating the common wisdom of different stakeholders. It is also a responsible way for scientists to return knowledge to our society.”

*Prof. Cui Lijuan, Nucleus team member,
Deputy Dean of the Chinese Academy of Forestry,
Beijing*

A highlight has been the establishment of consultative meetings between IWR and the Beijing Municipal Bureau of Landscape and Forestry to contribute advice on wetland conservation and management in Beijing. Due to its success these meetings have become a regular activity for IWR.

Another significant activity using IWR transdisciplinary methods is a coastal wetland restoration project that brings together organisations from research, education and industry. The activity aimed to build capacity for transdisciplinary research design and cooperation. For example, a project that focuses on water quality improvements (university) also developed clean aquatic products (economy); the landscape design subproject also involved an exploration of community-based ecotourism; and the model simulation subproject not only simulates the ecosystem, but also provides feedback for government decision making.

In the spirit of RRI, IWR also organised the Beijing Wetland Conservation Law Interpretation. This activity, involving a range of stakeholders, explored the interpretation and communication of a piece of government legislation. Several focus groups were established and participants were asked to review a book manuscript titled Interpretation of Beijing Wetland Conservation Regulation. Government officials



From the book “What we know about Aquatic Plants in Beijing”. Artwork designed during an IWR public participation activity © IWR

explained the background and local requirements of the legislation, the group of legislative institutions helped to improve the understanding of obscure articles of the law, the groups of law enforcement agencies introduced the difficulties encountered during law enforcement, and a general public focus group helped interpret the language, making it easier for public understanding.

Despite some challenges for project implementation – in part due to time and resource constraints – the establishment of a committee to promote public engagement, regular communications between IWR researchers and senior leadership, and support from government officials it is hoped that the opportunities presented through IWR’s involvement in NUCLEUS will become accepted practice for IWR researchers.



Participatory design workshop on World Wetland Day © IWR

“It is my hope, starting with just a few people, that there will be more researchers participating in the initiatives we have been rolling out through Nucleus. Through the implementation of IWR RRI policy, and with support from government and senior leaders in IWR, we hope that creating exchanges with citizens on research related topics and other RRI related activities will be incentivised and rewarded and become part of daily life for researchers at IWR.”

*Dr Lei Yinru,
Nucleus team member,
IWR, Beijing*



Beijing Wetland Day © IWR

FRANCE

UNIVERSITY OF LYON

WATCH THE VIDEO

<https://bit.ly/326anaS>



City of Lyon © NUCLEUS Project

World-class site of academic excellence, the Université de Lyon (UdL) is a community of higher education and research institutions. With 12 member and 25 associated institutions, it represents more than 140,000 students, 172 laboratories and 6,800 researchers. This large, well established alliance of institutions provided an interesting context for NUCLEUS.

The NUCLEUS team have worked closely with the university's governance, academic and research staff to bring about internal change; developing early career researcher training in RRI related activities, while also having a strong outward focus directed towards achieving one of the university's three main objectives as a federation: to develop and promote the dynamics of the Lyon Saint-Étienne site, in conjunction with all regional stakeholders (citizens, civil society, companies and local authorities). Three key ongoing areas of activity are outlined below.

Pop'Sciences: tackling societal challenges through public engagement

Pop'Sciences is a platform and collaborative network of people and institutions involved in science, including UdL, its members and other local partners. The platform promotes all activities related to public engagement and knowledge dissemination in the Métropole de Lyon and the Rhône territory.

With the objective of reaching local citizens, Pop'Sciences, in collaboration with the local administration, hosted their first festival of science in one of the Lyon's priority areas, La Duchère. More than 200 researchers engaged with communities through exhibits, experiments and public debates. As Embedded Nucleus Lead Cécile Rondeau explains, "the event was a great success, made possible through the support of local policy-makers and neighbors. The relationship [between UdL and La Duchère] is part of an

"One of the goals of the university is to open research to societal needs and to stimulate co-responsibility of all actors involved in research and innovation. We've been on this path for some time but through NUCLEUS we've had the opportunity to further develop and deepen our relationships with new actors in the community, and importantly we've institutionalised this approach."

*Prof. Nathalie Dompnier,
Vice President Culture, Science and Society,
University of Lyon*

engagement strategy that reached its peak with the festival and will continue into the future."

NUCLEUS provided the team with tools and skills to better analyse stakeholder views in order to strengthen the partnership between the university, policy-makers and citizens.



Pop'Sciences Festival 2019 © Laurence Danière - Métropole de Lyon

“The science festival was an excellent collaboration for our district,” says Christophe Merigot, deputy director of the Mission Duchère. “We have different ways of working, but the success of the festival has encouraged us to continue working on social diversity issues with the university. A new collaboration involves research on understanding the social mobility of youth in the district and we look to continue these relationships in the future.”

Science Shop: inventing tomorrow with all actors of society

The NUCLEUS team also collaborated with the Université de Lyon’s Science Shop to implement a more inclusive approach to their activities. The Science Shop serves as a bridge between the research community and civil society. It aims to support civil society organisations by providing expertise in how to consolidate their actions, assess their impact, experiment with innovative approaches and/or increase their advocacy.

One of the main outcomes of the NUCLEUS involvement was the establishment of a Steering Committee which sets the strategic orientation of the Science Shop and prioritises the topics for investigation and support. In this regard, the project facilitated an expansion of the committee with academics, policy-makers and civil society organisations.

In line with its more inclusive approach, the Science Shop has also deepened its relationships with the Métropole de Lyon. The strength of this partnership is demonstrated through a joint strategic reflection on “How to better use and promote university expertise in order to address territorial challenges”. Promoting important topics through a better collaboration with policy-makers, such as through joint planning, is clearly a better way to respond to societal challenges.

“The responsible research approach has enabled people to appropriate research – to know how it affects them and how they can connect with research. Involvement in the Science Shop has heightened our capacity to reach audiences in ways we have, in the past, not achieved.”

*François Besancenot,
Santé Goût Terroir,
Science Shop Collaborator*

“I like synergy. Even if it seems at times difficult - bringing people together and finding anchor points can make a significant difference.”

*Cécile Rondeau,
Embedded Nucleus Lead
2018-2019*

“NUCLEUS is coming to an end but the messages of RRI will remain, that is that research cannot be done by a small group of people telling others what knowledge is needed. We must conduct research, but we must involve communities in this process.”

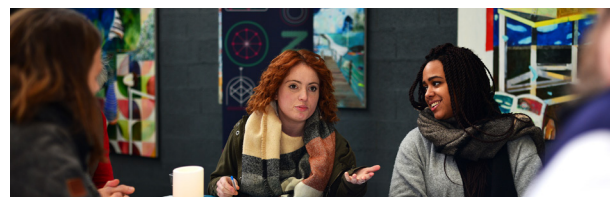
*Dr Florence Belaën,
Director Culture, Science and Society, UdL
and Embedded Nucleus Lead 2015-2018*

Spreading a sense of ethical responsibility with a new MOOC

Scientific ethics and integrity continue to gain attention, due in part to interest from the French Government and the RRI dynamics of the European Commission. Since May 2016, all French PhD students must complete scientific integrity and research ethics training. The aim is to embed ethical responsibility at all levels of a research institution. In responding to this issue, the UdL developed a comprehensive MOOC (Massive Open Online Course) about ethics.

The MOOC was conceived and developed by the Université de Lyon’s Research Ethics Platform and in its first offering in 2018 attracted approximately 3000 participants and more than 4000 for its second session in May 2019. The five week course provides all emerging researchers with the means to reflect on their personal practices and responsibilities and also that of their institutions. As Cécile Rondeau, comments, “[...] ethical questioning should not just be a matter for dedicated ethics committees, all researchers should engage in ethical reflection at the time they conceive and during implementation of a project. This is essential if we are truly concerned with aligning research with society’s values and needs.”

Summarising the progress of the Embedded Nucleus at UdL, Dr Florence Belaën commented that while there has been much progress, it is important to remain vigilant about incorporating societal views in research. “Our focus has been to strengthen relationships with civil society. For instance, we have institutionalised this through a new Steering Committee related to our Science Shop comprising many different societal actors. The aim of this committee is to help determine the needs of society, with society. To continue to undertake research without the input of broader society is simply not tenable.”



Seminar ‘Inventing tomorrow’s research labs’ ©
Vincent Noclin / Université de Lyon

GEORGIA ILIA STATE UNIVERSITY



© ISU

Ilia State University (ISU) was founded in 2006 following the merger of six historic academic institutions. Headquartered in Tbilisi, Georgia, and with 12 campuses and approximately 15,000 students and 800 staff, ISU offers a 'liberal education model, cultivating critical, analytical, ethical and creative skills in students, and contributing to the establishment of a knowledge-based society capable of developing sustainable solutions for the challenges of the 21st century.' This vision fits very comfortably with the objectives of RRI.

The NUCLEUS project was a unique and new experience for the university. Significantly, it was the first Horizon 2020 project to be implemented at ISU. "Speaking more pro-actively about how we can make our significant research more aligned with the needs of society was one of the considerable benefits of our involvement in the project," said Prof. Nino Dobarjginidze, Vice Rector for Research and Academic Affairs. "The experience has been both exciting and challenging. In a very positive way, our involvement has contributed to more nuanced insights on how various cultural contexts and the relationship between research/researchers, and society is shaped."

Through the support provided by NUCLEUS and the activities implemented to date, there is evidence that the university is increasingly building bridges between the research community, stakeholders, and the general public. The project was able to facilitate conversations within the university - between professors, administrative staff and students - to share project insights, and to discuss ideas and opportunities on how to increase responsible research aspects in all areas of the university's operations.

A Working Group, comprising professors from various disciplines, including education, energy, technology and ecology, has been established to assist the university in formalising their Responsible and Sustainable Research

vision and policy. The working group focuses on engaging multidisciplinary groups in a discussion about future research and issues of sustainability and policy. Meetings are organised in the format of a University Science Café. The first official meeting of the working group was held in March 2019, where a concept for integrating RRI and sustainability research objectives into ISU's processes was formally presented. Monthly meetings of the working group and interested parties are ongoing to continue the discourse on topics related to research and sustainability.



First meeting of the Working Group © ISU



Nino Dvalidze [r] Vice-Rector for Development and Foreign Relations [2014-2017], ISU during a field trip

© NUCLEUS Project



Prof. Doborjginidze at the Working Group meeting © ISU

“From 2005, Georgian Universities have undergone important processes and changes. Development and internationalisation of research became one of the main priorities.

The NUCLEUS project became the instrument for Ilia State University to acquire new knowledge, evaluate its research capacity, and foremost, to create interconnections with various stakeholders to develop its Research Strategy. Our core aim has been to promote essential research fields for the region and the country, and facilitate the university’s responsibility towards community development.”

*Prof. Nino Doborjginidze,
Vice Rector for
Research and Academic Affairs*

One of the most significant changes that ISU has experienced throughout the project has been a transformation in the attitude of researchers and internal and external stakeholders - research and academic staff - concerning RRI. Proactive engagement with external stakeholders has helped to strengthen relationships. Several training workshops and discussions were organised with media representatives, government and NGO’s, on topics associated with respective countries’ sustainable development.

A key challenge in terms of implementing the project was contextualising RRI - the translation of the concept into the local language and understanding. In the initial stages of implementation, there was a good deal of confusion about what was meant by RRI and how it was relevant to the university and stakeholders. Over time these misunderstandings have greatly diminished through more precise explanation and demonstration of the necessity of aligning national and societal needs with the university’s research and development agenda. These learnings are now a fundamental part of the Ilia State University Research Strategy.



First meeting of the Working Group © ISU



Nino Sharikadze, EN coordinator 2015-2016 © NUCLEUS Project

GERMANY

RHINE-WAAL UNIVERSITY OF APPLIED SCIENCES

WATCH THE VIDEO

<https://bit.ly/2FOXXuz>



Campus Kleve © Hochschule Rhein-Waal

Founded in 2009, the Rhine-Waal University of Applied Sciences (HSRW) is one of the youngest universities in Germany. Initiated by regional stakeholders and policy-makers, a major strategic goal of the university is to act as an interdisciplinary and international accelerator of innovation in a predominantly rural area in the Lower Rhine region of Germany.

The process-oriented and challenge-driven approach of RRI is closely aligned with the university's original vision of fostering structural change and a more dynamic socio-economic and cultural development agenda in the Lower Rhine region. This vision guided all Embedded Nucleus activities, with the project catalysing new and sustained approaches within the university.

As Prof. Dr habil. Jens Gebauer, Vice President of HSRW, explained: "The Embedded Nucleus allowed us to build on our founding history by connecting the academic profile of our university with a variety of stakeholders in our region. Based on the university's Strategic Development Plan, NUCLEUS added new participatory formats and increased strategic relationship-building between our university and external stakeholders."

Central to building stakeholder relationships was the creation of a new Working Group - Open Science at HSRW. This alliance invited representatives from media, economy, public engagement, civil society, government and the university, to work together on the future of science and innovation in the region. In dialogue-oriented half-day workshops stakeholders shared their visions and expectations on potential transdisciplinary research and collaborations. There is an intent to sustain the Working Group beyond the project, potentially as a sustainable Transfer Committee for Rhine-Waal University.

"Our Foundation participated in the Working Group Open Science at HSRW and in the Rhine-Waal Mini Maker Faire – The Green Edition. The collaboration with stakeholders from the university, and the dialogue with a range of experts from our region, was productive and inspiring. We see these kinds of multi-stakeholder activities as highly beneficial for the sustainable and innovative development of our region - and we will be happy to continue our collaboration with the university in the future."

*Herbert Looschelders,
Social and Ecology Foundation,
Kleve, Germany*



Meeting of the Working Group - Open Science © NUCLEUS Project

“We strongly benefited from being active partners in NUCLEUS,” said Dr Gerhard Heusipp, from HSRW’s Center for Technology and Knowledge Transfer (ZFIT). “This collaboration allowed us to develop the transfer strategy of the university into a more dialogue-oriented, multi-stakeholder and multidisciplinary approach. These learnings will be incorporated into a revised transfer strategy.”

Another outcome of the Working Group has been their involvement in shaping the university’s contribution to the German Federal Ministry for Economic Affairs and Energy’s EXIST programme. Targeting university-based start-ups, EXIST aims to improve the entrepreneurial environment at universities and research institutes.

Furthering RRI, NUCLEUS also facilitated the establishment of a Rhine-Waal Student Parliament, acting as a catalyst for multi-stakeholder dialogue between local and regional policy-makers, scientists and higher education institutions. In February 2019, 40 students from 6 schools in the region were joined by scientists and policy-makers to discuss the implications of energy and climate issues for the Lower Rhine region.

After initial briefing sessions and intense discussions with scientists, the students developed a parliamentary debate at Kleve town hall with the attendance of the local mayor and representatives from the City Council. The success of the parliament was such that the Municipality of Kleve have decided to host an annual Student Parliament to inform local policy-making processes.

Additional RRI collaborations included the first Rhine-Waal Mini Maker Faire, a festival of innovation, co-creation and creativity, which was organised in collaboration with the FabLab in Kamp-Lintfort and regional ‘makers’ from NGOs and Civil Society in April 2019.



Mini Maker Faire © Frank Reinert

The NUCLEUS legacy will be sustained largely through the opportunities created for multi-stakeholder dialogue, says Prof. Gebauer. “New alliances, such as the Open Science Working Group will bring together high-level experts from inside and outside the university, even after the project closes. We anticipate that innovative events, such as the Student Parliament or the Rhine-Waal Mini Maker Faire, will have a long-lasting impact on the future relationship of our university with communities in the Lower Rhine Region.”

“For the first time I can see how science and politics work together. We’ve been exposed to the science but also the very difficult decisions that politicians face when governing.”

*Lucas Kersjes,
Willibrord Gymnasium Emmerich*



Student Parliament © Annette Klinkert

“It is particularly important to do this because we can see how difficult some of these topics are and we need the connection between science and politics, both to help politicians make sound decisions but also to help scientists convey their messages in the best way to politicians.”

*Pia Schulte,
Junge Europäische Föderalisten NRW*



Student Parliament © Annette Klinkert

GERMANY

RUHR-UNIVERSITY BOCHUM



© RUB, Marquard

The Ruhr-University Bochum (RUB) is one of Germany's largest research universities hosting approximately 42,000 students and 5,200 staff. RUB is part of the University Alliance Ruhr (UAR), the consortium of the three Ruhr Universities, RUB, Technische Universität Dortmund and Universität Duisburg-Essen. It is one of only two German universities to offer the full range of academic disciplines incorporating natural and life sciences, engineering and social sciences and humanities on one campus. This structure has fostered a strong emphasis on interdisciplinary cooperation.

The Ruhr-region itself is undergoing large-scale structural and cultural change, from being defined by the mining industry and a strong identification with the production of coal and steel towards a modern metropolitan area with high-tech companies and excellent universities. RUB acknowledges its responsibility as a driving force in this change, and has thus served as an ideal location for NUCLEUS to test a range of RRI activities.

This commitment to culture change is demonstrated in multiple ways, for example the decision by the university to establish a technology campus on a site once housing an automotive plant. This campus also serves as a knowledge transfer hub linking science, economy and society.

Ruhr-University's commitment to public engagement is also evidenced through its development of the Blue Square, a facility specifically designed to connect the work of researchers with the broader community through public engagement activities. These activities are – amongst others – coordinated by the Science Communication Department of RUB, who have served as the Embedded Nucleus for Bochum. This commitment to change and the linking of science with society provided a fertile and receptive environment for NUCLEUS.

“NUCLEUS is implemented through the Corporate Communications Department of the university which has enabled us to better connect with the senior leadership of the university. While this initially proved challenging in such a large institution, over time these relationships have become very productive as the project developed.”

*Marco Rustemeyer,
Nucleus Project Manager,
Ruhr-University Bochum*

However, despite the wealth of engagement initiatives and co-operations in place the majority of these activities were somewhat disconnected and not recognised in the university's broader strategy. Additionally, the aspect of 'responsibility of scientific research' has been underrepresented. Recognising this gap, the Nucleus team approached the implementation of RRI by asking the question “what is research responsible for?” and how should this question should be addressed in Ruhr-University's broader strategy? Here we describe one measure to address this question.

An open discussion on the above topic was hosted by the university in late 2018. Following presentations from Prof. Dr Axel Schölmerich, Rector of the Ruhr-University, and Prof. Alexander Gerber, NUCLEUS Project Lead, a lively debate ensued involving participants from a variety of academic disciplines. Conversations broached many difficult topics with concerns about the potential impacts of RRI - type approaches on academic freedom expressed frequently and can be summed up by the following statement of concern:

“The formulation of guidelines for responsible research shall not be the base for the erosion of free research and the beginning of an era of mere contract research for commercial enterprises or governments.”

Nevertheless, most of the panelists agreed that universities should develop a realistic and open attitude towards the issue of responsibility. A series of brief articles written by academics from various disciplines were published on the Ruhr-University website, opening the conversation up to a much broader audience. The result was a collection of very precise and interesting concepts of responsible research. The web analytics indicated great interest in the articles, ranking some of them among the top ten.

All in all the measures described here were beneficial for gaining buy-in from senior leadership. Although it might be too soon to speak of cultural change at Ruhr-University, it is evident that the university's senior leadership is attaching growing importance to the idea of responsible research.

Furthermore, the measures described here were highly useful for connecting individuals who are champions in different aspects of responsible research and innovation. The Bochum Embedded Nucleus will continue to foster the development of an 'organic network' which will endure beyond the project's timeline.

“Instead of rejecting the social responsibility of science, researchers should acknowledge its potential for further development of scientific disciplines and for the strengthening of science as an institution of society.”

*Franziska Hoffart,
Chair of Macroeconomics,
Ruhr-University Bochum*

“Being part of NUCLEUS has enabled us at Bochum to connect many disparate activities that were already underway both internal and external to the university, but this project has provided us with direction on how we undertake our engagement.”

*Marco Rustemeyer,
Nucleus Project Manager,
Ruhr-University Bochum*



The Blue Square © RUB



Science College © Annette Klinkert

“Every scientist should only engage in research that leads to a world she or he would be able to live in and would want to live in.”

*Prof. Dr Maren Lorenz,
Department of History,
Ruhr-University Bochum*

“A big part of the project has been our work with doctoral students. To build capacity in early career researchers we invite every doctoral researcher to take part in RRI activities, we offer training on how to undertake RRI and relate their practices.”

*Annika Döring,
NUCLEUS Project Officer,
Ruhr-University Bochum*

MALTA

UNIVERSITY OF MALTA

WATCH THE VIDEO

<https://bit.ly/2LtdZhg>



City of Valletta, Malta

Located in the Mediterranean Sea, the island of Malta is home to the University of Malta (UM), a hub for international academic exchange. As the leading higher education institution in Malta, its research in the arts, sciences and humanities seeks to align with the economic, social and cultural context of the island. The Nucleus team focused their efforts towards changing the research culture within the university by making it more collaborative and more relevant to different stakeholders.

The creation of the Committee for Research Engagement

In developing their RRI implementation plan the Nucleus team conducted interviews with academics, students and general staff on their understanding of RRI, including personal views on the university's engagement with different stakeholders. The results provided a deep understanding of the challenges and barriers to embedding RRI in the university.

A key finding was that while there were productive collaborations within the university and with external partners, these collaborations were carried out within the personal networks of each researcher, creating an environment where, according to some interviewees, "the university felt like a group of small islands completely isolated from one another, hindering collaboration."

These findings led to the drafting of an RRI policy by the Nucleus Internal Committee (NIC)¹ that proposed changes within the university to catalyse engaged and collaborative research between departments and with external stakeholders. The NIC was also pivotal in lobbying for the establishment of the Committee for Research Engagement (CRE) which will be responsible for 'transforming'

¹ The Nucleus Internal Committee was formed by Dr Edward Duca, Daniela Quancinella, Nika Levikov, Prof. Saviour Zammit (Pro-Rector for Research and Knowledge Transfer), and Dr Axel Steuwer (Research Support Services Director).

"NUCLEUS gave us the opportunity to start a conversation at a strategic level within the university. Indeed our new strategic plan incorporates RRI. Not only do we now have the Committee for Research Engagement but we have RRI inculcated into our strategic plan."

*Prof. Ing. Saviour Zammit,
Pro-rector for Research and Knowledge Transfer,
University of Malta*

the university culture towards sustained RRI practices. The University Senate welcomed this idea and the CRE is expected to commence activities mid-2019.

The main objective of the committee is to connect and coordinate the activities already happening across departments and formalise the stakeholder engagement beyond the university. The CRE will tackle the internal communication barriers, transforming itself into several metaphorical bridges between these 'isolated islands', and establish and coordinate the soon to commence Engaged Researcher Awards.

"The University of Malta has a 400 year history, we've had just two years to try and bring about change. I'm very proud that in this relatively short period of time we've managed to facilitate some really positive changes ... the Committee for Engaged Research and our RRI training programs are two key approaches that will help ensure RRI practices are sustained beyond the life of the NUCLEUS project."

*Dr Edward Duca,
Science and Innovation Communication Lecturer,
University of Malta*

“At the end of the day, and as the public university of Malta, it is extremely important that we respond in multiple ways to what society needs. What society needs is for the university to listen and respond to societal needs in ways that make sense to multiple constituencies. In this regards NUCLEUS has been a valuable activity to guide this approach.”

*Prof. Godfrey Baldacchino,
Pro Rector International Development
and Quality Assurance,
University of Malta*

Breaking down the term RRI and its implications

Another impediment to implementing RRI was the term itself. RRI was assessed by staff and students as confusing. With this in mind the team agreed to use ‘engaged research’, to denote the involvement of different stakeholders in the research process. This term has been well accepted within the university.

There was also concern about different stakeholders’ agendas, and the potential for research to be impacted by the economic and/or political values of third-party stakeholders. Over time these fears have diminished with recognition of the direction that the EU Research and Innovation policy is moving and that collaboration with external parties is an important prerequisite when undertaking research.

The university, through its Research Support Services Directorate (RSSD) is also building RRI into its activities. The RSSD is an entity which supports academics in securing external funding for research. Importantly, the RSSD Director is part of the Nucleus Internal Committee.

Director of the RSSD Dr Axel Steuwer stressed the importance of a fully engaged research approach, “RRI affects all researchers and we are trying to assist scientists and academics, whether they are working in the laboratory or seeking funding, to achieve excellence. The goal of NUCLEUS and of the RSSD office, of growing our European Commission funding base, are two sides of the same coin.”

An Engaged Research Award will also be established to further motivate and reward collaborative research, with a particular emphasis on recognising academics and researchers who achieve excellence in their public engagement efforts. This activity will be led by the CRE on an annual basis.

Finally, to round up the initial phase of this transformation process, the team worked with the Faculty of Media and Knowledge Sciences to develop a research assignment in which undergraduate students designed an online questionnaire to understand how the public perceive the

university. The results of the survey will help to inform the university’s Strategic Development Planning Initiative, whose goal is to strengthen its engagement with society.

RRI training: shaping the next generations

To build capacity and confidence in early career researchers, the Nucleus team have developed a workshop for PhD students to help them understand how they can embed RRI in their research and to emphasise the importance of multidisciplinary.

“Sharing their RRI experience with other students and really understanding how RRI can be applied in different ways for every discipline is the main objective of this training. Asking questions and reframing their research by involving external actors or stakeholders, even if they don’t have tangible results,” explains Daniela Quacinella, Nucleus Project Officer.

The case of the University of Malta is a good example of the importance of self-evaluating our environment before taking action. Only by tailoring the implementation strategy to the specific and unique sociocultural context of each place will the concept of RRI be truly embedded and sustained.

“We developed an RRI research training program for undergraduates, Masters and our PhD students coming from different disciplines. Ultimately we hope to extend this also to academics. This activity is going to be supported by the Committee for Research Engagement which is so important to ensuring this program is sustained beyond NUCLEUS.”

*Daniela Quacinella,
Nucleus Project Officer,
University of Malta*

“I’ve grown to appreciate the concept of transferable skills. I strongly believe that research should be done in this way. We’re moving towards a progressive, acquirable, fair, global society where disciplines can stand on their own but they can also blend where appropriate.”

*Nika Levikov,
Research Project Officer,
University of Malta*



Collaborative team at the UM: [l to r] Dr Axel Steuwer, Daniela Quacinella, Nika Levikov, Dr Edward Duca, Ms Angie Mifsud, Prof. Godfrey Baldacchino and Prof. Ing. Saviour Zammit

NETHERLANDS

UNIVERSITY OF TWENTE



© University of Twente

The University of Twente (UT) is a public research university located in the Netherlands. It offers degrees in the fields of social sciences, the natural science and is highly specialised in engineering. UT collaborates with Delft University of Technology, Eindhoven University of Technology and the Wageningen University and Research Centre, under the umbrella of 4TU and is also a partner in the European Consortium of Innovative Universities (ECIU).

The university is continuously working towards transitioning from a more engineering focused institution with some social sciences to one where social science is strongly embedded across all aspects of the university's business and teaching. Indeed, the motto of the university is High-Tech Human Touch – emphasising the relationship between science and society – RRI.

The UT Action Plan for Nucleus focused on raising awareness of, and capacity building for, RRI amongst researchers and students. Building a community of practice catalyses the embedding of RRI into the practices of researchers and students. This community was formed and maintained largely through meetings (formal and informal), training (including lectures), and mentor and peer interactions.

Science and Society: Working with researchers to support societal engagement

One of the primary objectives of the Nucleus activities at the UT has been to work with researchers to help them reach their aspirations of working with and for society. This has involved providing additional support for the university's student training programs for both Masters and PhD students.

One very important aspect of this training is building an understanding of the broader role of science in society – how emerging scientists will need to interact with

“The NUCLEUS experience has provided me further justification for why I should work with people from different backgrounds – moving beyond my own research interests and learning much along the way. I think RRI is about what kind of relationship you want to have with society, how to empower people, not just do outreach.”

*Dr Anne Dijkstra,
Assistant Professor in Science Communication,
University of Twente*

communities and how might they do this most effectively. New curricula materials, designed to help students incorporate societal needs in their research, have been developed through the support of NUCLEUS and these are now formally incorporated into the university curricula.

According to Dr Anne Dijkstra, such training helps students to recognise that the role of researchers and research does not start or end in a laboratory but requires interaction with society to help address and define how and what types of research might be undertaken.



Science2Design4Society event © University of Twente

Through NUCLEUS, UT has also been able to develop and introduce a compulsory program in ‘Science for society training’ for research Honors students. This course focuses on developing students’ skills in communication, innovation and society in the context of RRI.

Drawing on one of the RRI Keys and through NUCLEUS support, UT has also developed and introduced mandatory training for raising awareness of scientific integrity.

To further strengthen these programs the university hosted a Think-tank event with a range of internal and external stakeholders to gather ideas and highlight where additional research will be needed to improve the way the university contributes to meeting societal needs. The Think-tank was organised in collaboration with the RUNIN training week, in which science and society and regional impact were the main topics. The focus was on two overarching questions: how can universities meet societal expectations and desires regarding their contributions? And how can the university practically include societal needs in current and future research projects?

The policy recommendations from the Think-tank were integrated in a presentation to the Economic Board of the region of Twente in March 2019 and inspired several scientific publications by the RUNIN PhD students.

“Within their training week, the Think-tank offered a great opportunity for PhDs and societal stakeholders to interact on real life cases. I’m convinced that it enhanced mutual understanding of societal needs in an inspiring and engaging setting,” said Inge Bakker, Head of the Regional Research Department for the Twente municipalities of Kennispunt Twente.

In the case of UT, while much has been achieved in the short implementation period, some shortcomings with the project’s implementation approach have been recognised- importantly, that without sufficient funding to develop RRI skills in researchers, and for researchers in faculties that do not have any communication or engagement support, researchers must be highly creative and build strong relationships to build sustainability into the project.



The Cultural Adaptation Study, led by UT, was a pivotal activity that brought many ideas and cultures together and provided the important context in which to view science in many different societies. Each country is different, each region is different and each organisation implementing RRI is different. **The report can be found on the NUCLEUS website.**

“The idea of an Embedded Nucleus is important, but they should not be assessed on what each one has done that is good or bad but viewed as a collective and learn from the collective experience of 10 Embedded Nuclei.”

*Dr Anne Dijkstra,
Assistant Professor in Science Communication,
University of Twente*



RUNIN DesignLab workshop during the Science2Design4Society event © Peter-Paul Verbeek

SERBIA

MATHEMATICAL INSTITUTE OF THE SERBIAN ACADEMY OF SCIENCES AND ARTS



Opening day of the May Month of Mathematics © Maj mesec matematike M3

Mathematics may not be the first thing that comes to mind when considering public engagement with research, but the Mathematical Institute of the Serbian Academy of Sciences and Arts (MISANU) has taken important steps to embed and sustain RRI in its activities. A key player in this process has been MISANU's Council for Responsible Research and Innovation.

The council, which includes young researchers, senior scientists and external stakeholders, was established in 2018 to direct, guide and provide support for activities related to open access, science promotion and public engagement. By connecting research with industry and economy it enables the Institute to address a range of RRI issues such as ethics in science and gender equality.

To date the role of the council has principally been to codify and promote existing good practice, building on solid foundations to make further improvements. However, in addition the council also set up a working group to write a Code on Gender Equality for MISANU. Gender equality and support for women in science is also the central focus for an RRI information day which is being organised with external stakeholders.

Dr Đorđe Baralić, a member of the Council, explained that the council gives people a chance to exchange opinions and offer advice, and to identify RRI champions within the Institute and to include members from outside who are not mathematicians. The RRI Council provides the institutional space to help reconcile the diverse pressures and demands from politicians, public and researchers.

"The NUCLEUS project encouraged us to get out of our comfort (academic) zone and build meaningful relationships with communities and groups outside our 'bubble'. It inspired us to reach out to the societies for ethics and gender equality with whom we didn't collaborate previously, create our own Code of Ethics and think towards a Gender Equality Plan. In that sense, NUCLEUS taught us that diverse and effective interactions could lead to a more responsible future."

*Marija Šegan-Radonjić,
Embedded Nucleus Manager,
MISANU*

"If we want to see progress in mathematics, then we must invest in it, and we must bring communities with us, through dialogue," said Dr Baralić.

In addition to being a space for dialogue, the Council is also helping to enable and promote specific engagement activities. In 2019 important science for society projects include MISANU's work with Telecom Serbia A.D., with the company Elektroprivreda Srbije and the digitalisation of Cultural Heritage.

Perhaps the most notable of such activities is the May Month of Mathematics, a highly visible and high profile event that takes place across Serbia in multiple institutions.

The May Month of Mathematics (or M3) had existed for some years, but NUCLEUS has helped to change the scale of the event. Whereas activities had previously been limited to Belgrade, in 2019 M3 spread across the whole country. In partnership with the Center for Science Promotion of the Republic of Serbia, the RRI team at MISANU organised a month of events, with the aim of stimulating a mutual understanding between society and the scientific community and to demonstrate how science, especially mathematics, contributes to society and our quality of life. It is estimated that more than 250,000 visitors participated in towns and cities across Serbia.

In 2019 the theme for M3 was Mathematics of the World, and the public was invited to participate in a diverse range of events such as exhibitions, popular lectures, small festivals, workshops, scientific cafes, and games for children. In addition to showing how mathematics can be applied to studying the Earth (e.g. in geography and climatology), M3 in 2019 also emphasised the importance of mathematics in finding solutions to the problems posed by the challenges of global warming, various ecological issues, and developmental inequalities.

One of the challenges of RRI is to connect mathematicians with people and offer a new view of mathematics to the public, to show the importance of mathematics to everyday life and to the world we live in. What was surprising, for organisers was not just how many mathematicians wanted to be involved but also the public's appetite for it. The M3 call for applications attracted responses from 45 towns and cities across the country.

The Council and the May Month of Mathematics are ongoing projects and clear examples of how RRI can be embedded and sustained within an institution.

"I am really proud that MISANU is doing this", says Dr Baralić. "NUCLEUS and projects like this are small steps to making society better."



© Maj mesec matematike M3

"For eight years, the Center for the Promotion of Science has been cooperating with MISANU, through the manifestation May Month of Mathematics. Đorđe Baralić, a representative of MISANU with his enthusiasm and incredible skills in the world of mathematics, always contributes to making the manifestation from year to year better. Each year scientists from abroad participate in the event, all these activities are easier with our partners from the MISANU."

*Danijela Vučićević,
Expert Associate for Program Activities,
Center for the Promotion of Science*



Exhibition 'Mihailo Petrović Alas, the Progenitor of the Serbian School of Mathematics', SASA Gallery, 2018 © Veselin Milunović Aćimov

SOUTH AFRICA

THE SOUTH AFRICAN INSTITUTE FOR AQUATIC BIODIVERSITY

WATCH THE VIDEO

<https://bit.ly/2RQsfNu>



The South African Institute for Aquatic Biodiversity (SAIAB) is an internationally recognised centre for the study of aquatic biodiversity and a Research Facility of the National Research Foundation (NRF). The Institute is involved in many multi-institutional and multi-disciplinary projects and has a strong ethos around public engagement. As a publicly funded research institute SAIAB's research informs policy in both the marine and freshwater sectors. SAIAB undertakes the Nucleus activities in partnership with the South African Agency for Science and Technology Advancement (SAASTA). SAASTA is the designated agency for the promotion of science in South Africa and engaging all stakeholders and the public in science is a core role for SAASTA in the South African National System of Innovation.

The South African RRI approach, expressed by SAIAB as 'fully engaged research', can be seen as a continuum, from early career training through to implementation at the highest levels of government.

Catalysing change from within

In its role as the Embedded Nucleus, SAIAB has integrated RRI across many areas of its business, from training the next generation of scientists to engaging with the end-users of research in business, industry, media, the general public and government. Engagement has been part of SAIAB's culture and change agenda for about a decade, influenced by both the national science agenda and its role as a government funded organisation.

With additional support and motivation from the NUCLEUS project SAIAB has driven this engaged research culture even deeper into the organisation to encourage a sustained culture of RRI beyond the life of the project. Multidisciplinary research is entrenched and transdisciplinary research is gaining traction as a necessary component of the science endeavour. SAIAB's internal governance supports implementation of RRI through mechanisms such as the Director's Scientific Advisory Committee, the Collections Advisory Group; the Risk, Health and Safety and Environmental Committee; the Equity Committee and a Transformation Committee.

The Transformation Committee, comprising the Institute's senior leadership (inclusive of the Nucleus representative, Manager Communication and Governance), aims to further strengthen and guide SAIAB's RRI path, its main focus being to achieve social justice - equitable employment across race,

"SAIAB seeks to embed RRI through transformation, effective dialogue and strategic planning, aligning its activities with NRF values and localising the UN's Sustainable Development Goals. NUCLEUS has encouraged us to look inward, to reflect on what we are doing, and see ourselves differently. We have realized through this process that we have many strengths in an RRI sense and that we do not need to reinvent wheels but continue to build on our strengths and work on any weaknesses."

*Dr Angus Paterson,
Managing Director,
SAIAB*

gender, age, disability, gender or hierarchy. This equity focus is critical for South Africa as it strives to bring balance to the science system and redress historical imbalances.

The importance placed on engagement is further demonstrated through the incorporation of RRI principles into the Institute's 2019-2025 strategic plan. SAIAB's reporting framework for scientists captures and acknowledges this significant activity. SAASTA's science engagement strategy also aims to ignite the interest of the South African public to engage with science.

Further, RRI principles are also firmly embedded in the guiding principles of the NRF. In 2019 the South African Government introduced a policy confirming its commitment to public science engagement through a White Paper on Science, Technology and Innovation. This paper outlines the government's expectations of how scientists engage with society.



Water World - SAIAB's pop-up science centre at Scifest Africa

© SAIAB

Living RRI: Sustaining the Nucleus approach

From hosting or participating in activities that promote, teach and engage people in science, implementing a strong social media culture, or engaging closely with regional bodies, government agencies and NGOs, SAIAB has truly lived the concept of RRI and worked with many publics to build acceptance and adoption of RRI practice into its activities.

Issues of distance, significant in a country as vast and distant from Europe, have been managed through the relationships established between the on-site project manager at SAIAB in Makhandanda and SAASTA in Pretoria, while relationships with the broader NUCLEUS community in Europe have been maintained through formal mentoring, online tools for information sharing, visits to some of the other Embedded Nuclei when feasible, bi-annual face-to-face team meetings and annual conferences.

Further efforts to expand the Nucleus approach across the NRF's other research institutes is being considered with plans to adopt a similar model, with an RRI mentor working closely with other Institute staff to build local capacity.

“NUCLEUS is one of several Horizon 2020 projects in which SAASTA is currently involved, helping to build international bridges between South Africa and the global science community.”

*Dr Jabu Nukeri,
Managing Director,
SAASTA*

“To embed RRI you need to work hard to win hearts and minds in your organisation and find ways to help stimulate co-responsibility for change among staff... and this investment in engagement must be acknowledged as having value.”

*Penny Haworth,
Manager Communication and Governance,
SAIAB*



Early career researchers working in SAIAB's National Fish Collection

© NUCLEUS Project

“NUCLEUS, as an example of a large international research project, is very close to what we in NRF, and the science engagement portfolio in particular, want to achieve: that is to continue to drive the global science agenda in a way that is cognisant of the needs of society. The nature of the relationship between science and the society in which it is taking place, must remain a key concern for all of us.”

*Dr Beverley Damonse,
Group Executive: Science Engagement
and Corporate Relations,
NRF*

Training the next generation of early career researchers to be RRI ready

Training the next generation of scientists to be 'RRI ready' is another strategy used by SAIAB to embed RRI in the institution and the culture of South African science generally.

All graduate students are encouraged to engage early with the communities in which they work and training is provided through the Institute to support this. While SAIAB does not offer a formal curriculum, early career researchers and graduate students are invited to participate in weekly issues-based discussions to broaden perspectives and consider how science can effectively engage in dialogue with society.

“SAIAB takes its role in training the next generation of aquatic scientists very seriously,” said Prof. Olaf Weyl, DST/NRF Research Chair for Inland Fisheries and Freshwater Ecology, SAIAB. “Our students must be well versed in the biological sciences of course, but equally they must be able to contextualise their research in terms of its value to society. As a result, we develop student groups that are very diverse in both their academic and their socio-cultural backgrounds.”

“In the context of a developing country such as South Africa, where poverty eradication, employment, food security and agriculture are major national policy objectives, the real challenge is to weigh up the risks associated with these problems and develop viable options that are considerate of many societal needs.”

*Prof. Olaf Weyl,
DST/NRF Chief Scientist,
SAIAB*

UNITED KINGDOM NOTTINGHAM TRENT UNIVERSITY



© NTU

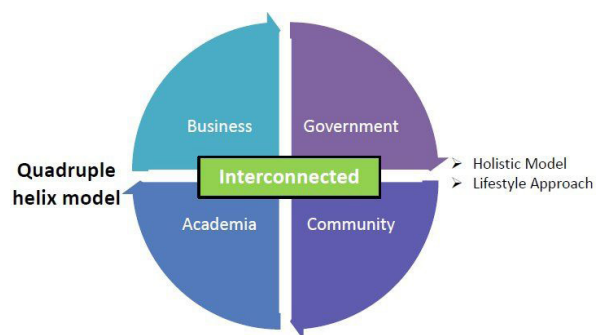
Founded in 1992, Nottingham Trent University (NTU) is one of the largest universities in the UK. With nearly 28,000 students and more than 3,500 staff across four campuses, it contributes £496m to the UK economy every year. NTU is home to world-class research, excelling in fields such as sustainable futures, safety and security of citizens and society, health and wellbeing and medical technologies, and advanced materials.

The university’s participation in the NUCLEUS project has involved many aspects of the institution, including: PhD/ early career researcher training and development, fostering transdisciplinary research, identifying areas for embedding aspects of RRI within the NTU strategy e.g. research integrity, and building sustainable networks with stakeholders.

NTU as an institution has adopted RRI with support from senior leaders. These changes are evidenced by structural changes and also by efforts to promote culture change. The input of NUCLEUS into doctoral training, strategic plans, new approaches to research integrity and multiple conversations with different stakeholder has produced a ripple effect across NTU.

The sustainable networks established through the project rely significantly on NTU’s collaboration with Nottingham City Council (NCC), liaising with their leader in Engagement

and Participation, Jon Rea who led the Mobile Nucleus. According to Jon there are a number of initiatives that arose from the Mobile Nucleus and the NUCLEUS field trip. All these have strengthened the links between local government, industry, universities and the public, thus incorporating all strands of the quadruple helix/multiple Nucleus cells².



A vehicle to promote excellence and knowledge exchange across 4 key sectors

© Prof. Philip Leigh, University of Hull, UK

² Exploring Quadruple Helix Outlining user-oriented innovation models by Arnkil, Robert; Järvensivu, Anu; Koski, Pasi; Piirainen, Tatu (2010), ISBN 978-951-44-8209-0 <http://tampub.uta.fi/handle/10024/65758>

The NUCLEUS Field Trip to Nottingham in 2017, provided an opportunity to harness the views of a broad range of stakeholders. One project in particular that showcased the potential for RRI to create societal change was ‘Small Steps Big Changes’, involving the city council, Nottingham CityCare Partnership, and the NTU Centre for Children and Families. This project procured National Lottery funding to help families in four particularly deprived areas of Nottingham.

The RRI approach adopted by NTU led to strategic developments with NTU’s Partnerships, Local Engagement and Commercial Services (PLECS) group to engage with local communities in achieving Smart Cities objectives. PLECS has now adopted the quadruple helix approach to inform new initiatives.

The Smart Cities initiative now follows the Mobile Nucleus model. Smart Cities is an archetypal application of the quadruple helix, with buy-in from citizens essential for its success. This is particularly true in light of the tensions between privacy and Open Data. The RRI approach has emphasised co-production of knowledge instead.

NTU plays a key role in the STEMCITY Network which developed the original NUCLEUS concept. STEMCITY’s Festival of Science and Curiosity (FoSaC) now in its 5th year has grown supporting RRI principles and becoming part of the city’s culture. FoSaC recently launched as a limited company with NTU Pro-Vice Chancellor Prof. Mark Biggs, on its board.

“The city council has a coherent strategic vision, and NTU has been able to gather activity across the university to create a more unified network, bringing synergistic benefits. Improved dialogue between the two bodies enables better orientation of strategy and alignment of efforts to achieve mutual goals, that is, ‘shared problems, shared methodologies,” according to Jon Rea.

Further, being part of NUCLEUS has enabled NTU to better understand how the relationship between the city council and academia can benefit all parties. This led to (i) a joint EU

bid to develop an RRI approach in our local economy/society [TeRRItories]; (ii) RRI forums in Urban Farming and Graduates as Citizens; (iii) the city centre strategy informed by research ideas such as urban greening, transport, development and sustainability; (iv) tackling Grand Challenges such as sustainability (which require the collaboration of many different stakeholders and disciplines), and where NTU’s new strategic research themes actively promote transdisciplinary working.

Nottingham’s economy is in transition, with NTU’s Civic Exchange looking at the issue of types of employment in the area. For example, the city council has invested at least £30,000 in science education per year to promote the development of skilled employment in the fields of technology and biomedical research. The NUCLEUS project has promoted a substantial culture change in the Nottingham municipality, which is projected to bring tangible benefits to the local economy in the medium to long - term.

Another very significant aspect of the NUCLEUS journey was the opportunity to co-design a multi-disciplinary course on the ethical, legal and social aspects of biomedical technology for the new Medical Technologies Innovation Facility, where scientists, engineers, clinicians and entrepreneurs will work collaboratively to develop products and materials.

Comments and recommendations

Culture change is difficult to achieve. It requires considerable time and effort, and the results are very dependent on personnel and often require a long-term, sustained effort with regard to networking. Structural change can enable the culture to be developed and maintained even when there is turnover of personnel, however the buy in and support of senior management is vital to this sustainability.

Furthermore, until there is a change in the way the academic process rewards individualistic effort, and the Research Excellence Framework favours silos within disciplines rather than multidisciplinary teams, the challenges to implementing RRI remain high, but not insurmountable.



The Nottingham Festival of Science and Curiosity © Ignite!

MOBILE NUCLEI

A **Mobile Nucleus** was an activity that the host organisation agrees to incorporate into existing events. The concept was developed together with the institutions involved, gathering and integrating their experiences and expectations. Seven different formats were offered to shape a Mobile Nuclei event. Twenty-one events were conducted by consortium partners.



RRI TRAINING

Training scientists in RRI is generally conducted through workshops, where the RRI concept, its background and applicability is discussed with, and among researchers. This format can be very effective in bringing interested researchers, scientists and research mediators or brokers, together to increase understanding of RRI, its usability, its limitations and the opportunities that it presents.

INSTALLATION

An Installation is a setting that creates an environment conducive to discussion and open dialogue among people interested in sharing ideas on a specific topic or issue. An Installation can take many forms, for example it may be a booth-like space, an interactive exhibit, a symbolic installation or even an artistic installation that is related to the topic.

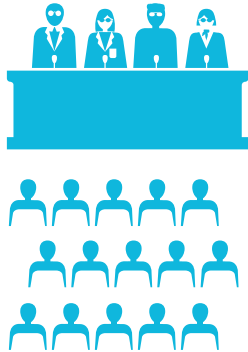
HACKATHONS

A Hackathon is a design 'sprint-like' event where computer programmers and designers come together to collaborate and solve problems. At a scientific hackathon, researchers, developers, designers and those interested in software development, work together in interdisciplinary groups to discuss, craft and develop prototypes of tools and hardware or apps and software which are designed to solve a problem.



"Importantly for #LivingRRI and our NUCLEUS journey, the event had a strong entrepreneurial element and brought together not just academia and industry, but also people who could provide patients' perspectives."

*Dr Kenneth Skeldon,
Wellcome Genome Campus,
Cambridge, England*



OPEN REFLECTION

Open Reflection is a workshop activity, lasting one or two days, where participants explore specific aspects of a topic or plan and possibly implement an activity that is part of an existing process. RRI Open Reflection workshops focus on stakeholders' involvement in a particular process.



SCIENCE SHOP

A Science Shop is a single event, that simulates the way the requests and problems of civil society can be transferred into a research environment. Citizens are called clients, in the context of the 'Shop'. Science Shops operate under different names and in different ways throughout Europe and the world.



OPEN TALKS

Open talks are discussion formats for citizens: Fishbowl (a discussion format which is useful to stimulate dynamic discussions) and Reverse Science Café (a discussion event where the dialogue is initiated by experts posing questions and listening to answers from the audience).



CO-DESIGN

Design workshops are a format to develop science communication activities and strategies. They are based on design requirements (wishes and demands) of both people with a background in actual science/engineering, and experts in the field of communication/collaboration.

RRI Basecamp Workshop: Relations Mapping

"The workshop helped participants to better understand the local and the European context of RRI and Science-Society initiatives. It was an opportunity to reflect on how their institutions have been connecting with the society."

*Amilton Moreira,
Ciencia Viva Science Centre,
Lisbon, Portugal*

Stakeholders Open Session: Dundee Policy Lab

"We brought together researchers, policy-makers and civil society to address policy challenges. It was the first stepping stone in the creation of a Dundee policy lab which will support research to influence policy decisions."

*Dr Heather Doran,
University of Dundee,
Scotland, UK*

RRI Basecamp Workshop: Collaborative Science

"The workshop let participants talk about their needs and expectations of making science more open. It gave them an overview of projects and the current discussions about how to make research more collaborative."

*Doris Zhang,
BAST,
Beijing, China*

MOBILE NUCLEI MODULAR EVENTS TO FACILITATE CROSS-SECTOR DIALOGUE

Of the 24 partners in the NUCLEUS consortium, fourteen are engaged in what NUCLEUS describes as Mobile Nuclei (MN). Mobile Nuclei events supported the public engagement activities of the NUCLEUS project through hosting one-time events that test innovative RRI public engagement approaches in different settings and environments.

Between November 2017 and June 2019, twenty-one Mobile Nuclei events took place in Europe and China. With the participation of more than 2000 people, these activities helped to build bridges between worlds that are often disconnected by facilitating discussions on topics that are not part of the everyday life of citizens. The formats chosen for these events were very diverse and included RRI Trainings, Social Hackathons, Open Dialogues and Design thinking workshops, Installations, DIY pop-up workshop and Science Cafés.

The topics selected by our partners reflect the themes of ongoing debates and the current interests of our societies: fine dust pollution, smart cities, university outreach to youths, GMOs, hands-on biotechnology, bio-hackathon, artificial intelligence, refugees and science, collaborative science, behavioural sciences and open dialogues about co-designing spaces.

Mobile Nucleus events were a stepping stone towards the development of more complex programmes, but in specific cases, thanks to the event and the possibility of having these open conversations, a shift happened. Their unit of exchange was ‘the conversation’. Organisers are aware that learning and

“Policy-makers and stakeholders can play a leading role in building bridges and should take the first step in addressing science and higher education institutions for RRI. In Germany, the City administration and local politicians have a broad authority to decide on the implementation or development of soft and hard infrastructure, and which may be beneficial for research institutions in attracting individuals of high potential in the fields of science and higher education. The economic development of Cities is often closely related to capacity for innovation...”

*Theda Minthe,
City of Hannover, Germany*

incorporating new information is a process that generally happens over time, but at least the conversations have been started.

A good example of this was the Mobile Nucleus in Hannover, where researchers, civil society representatives, civil servants, students and car industry stakeholders gathered to discuss the problem of fine dust pollution. After the event, researchers participated in city council gatherings that aimed to tackle the problem of urban planning, pollution and city greening. The event helped all participants appreciate the value of collaboration and open dialogue – and acknowledge that complex multidisciplinary problems that require research need to be discussed with many actors.



Stakeholders Open Session: Fine dust pollution. City of Hannover, Germany © NUCLEUS Project

To ensure the legacy of the NUCLEUS project, and building on the learnings of both Embedded Nucleus and Mobile Nuclei, a new digital platform for science engagement has been established. The platform showcases inspiring RRI examples and provides practical advice on how to engage with diverse audiences to foster challenge-driven innovation. Through the joint efforts of Erasmus + SUSTAIN project (Sustainable Landscapes) this platform will endure beyond the NUCLEUS project and can be accessed through the European Science Events Association (EUSEA) website at www.eusea.info/platform.

“Together with expanding networks among the Mobile Nuclei organisers, we’ve had the opportunity to join and embed public engagement formats in the current programmes of our partners. It was not something that came from ‘outside’ and I think that enriched the whole process. I see these events as steps to foster civic spaces where science-related concepts, ideas, approaches and communities can flourish.”

*Andrea Troncoso,
EUSEA Project Officer,
Mobile Nuclei Coordinator*



Science picnic: Air Pollution. Ilia State University, Tbilisi, Georgia
© NUCLEUS Project

“Mixing is a good recipe! Keep is as varied as possible!”

*Ana Khundadze,
Ilia State University,
Tbilisi, Georgia*

“They are a great opportunity for provoking engaged and meaningful dialogue. However, the effort of finding the right setting and the right issues to be discussed should not be underestimated.”

*Catherine Gregori,
City of Bochum,
Germany*

“The Mobile Nucleus workshop let participants discuss their needs and expectations of making science more open. It also gave them an overview of projects and the current discussions about how to make research more collaborative.”

*Ms Chao Zhang,
Project Manager,
BAST*



Science Café and Guided Tour: Botany and Us.
AHHA Science Centre, Tartu, Estonia © NUCLEUS Project

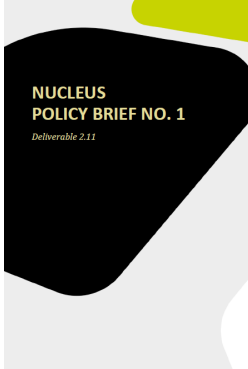
“Participants were eager to speak their minds. Also, it didn’t turn into an argument or political debate and it really focused on communication and how everyone could contribute.”

*Annika Vesselov,
AHHA Science Center,
Tartu, Estonia*



Installation: The Talking Bike. Bochum City Marketing,
Bochum, Germany © NUCLEUS Project

POLICY BRIEFS



<https://bit.ly/2XqAcis>
Policy Brief No. 1



<https://bit.ly/2LC4jRx>
Policy Brief No. 2

VIDEOS



<https://bit.ly/2EMyge8>
Bringing RRI to life



<https://bit.ly/2Xj3boh>
What is NUCLEUS?



<https://bit.ly/30eCanT>
NUCLEUS Approach



<https://bit.ly/2RODue6>
Field trips:
Engagement and
Media



<https://bit.ly/2IrAShk>
Field trips:
Economy and Public
Policy



<https://bit.ly/2Xptqhq>
Field trips:
Research Institutions and
Civil Society



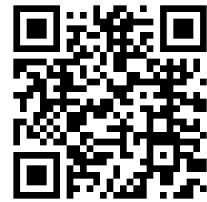
<https://bit.ly/2KWcWXQ>
SAIAB as an
Embedded Nucleus



<https://bit.ly/2J8mxZh>
NUCLEUS 2018
Conference



<https://bit.ly/2LwZyly>
Public Engagement:
Paul Manners



<https://bit.ly/2XllmEM>
Public Engagement:
Giulia Bubbolini



<https://bit.ly/2EOXxuz>
Student Parliament
at Rhine-Waal
University



<https://bit.ly/2LtdZhg>
Lessons from the
Implementation
of RRI in the
University of Malta



<https://bit.ly/326anaS>
Lessons from the
Implementation
of RRI in the
Université de Lyon



<https://bit.ly/2RQSFnu>
Lessons from the
Implementation of RRI
in SAIAB

PUBLICATIONS AND PRESENTATIONS

JOURNAL ARTICLES/PROCEEDINGS

2019

- Belaën, F. (2019). *Les Boutiques des sciences, lieux de coproduction des savoirs avec la société civile*. In *Musées et Recherche. Vulnérabilité, scrupules, dilemmes*. Office de Coopération et d'Information Muséales (OCIM), Université de Bourgogne. ISBN : 978-2-36441-326-9
- Carrier, M. (2019). How to conceive of science for the benefit of society: prospects of responsible research and innovation. *Synthese*, Special Issue on Responsible Research and Innovation, published online May 21, 2019.
- Carrier, M. & Gartzlaff, M. (2019). *Responsible Research and Innovation: Fears and Hopes in the Scientific Community in Europe*. Under review.
- Carrier, M. & Irzik, G. (Eds.) (2019). *Synthese* Special Issue on Responsible Research and Innovation. Forthcoming.
- Dijkstra, A. M. & Yin, L. (2019). Insights from China for a global perspective on a responsible science-society relationship. *Cultures of Science*, 2(1), 65-76.
- Dijkstra, A., Heerink, R. & Van den Berg, M. (2019). *Pilot Samen grondwaterpeilen. Rapportage onderzoek WP4*. Retrieved from <https://research.utwente.nl/en/publications/pilot-samen-grondwaterpeilen-rapportage-onderzoek-wp4>
- Haworth, P. S. & Dijkstra, A. M. (2019). Putting RRI into practice at a local level in South Africa in *SciCOMM 100, Conference proceedings*. Submitted.
- Schuijff, M. & Dijkstra, A. M. (2019). *Practices of Responsible Research and Innovation: A review*. Under review.

2018

- Gerber, A. (2018). How to 'mainstream' the 'upstream' engagement. *Journal of Science Communication JCOM*, 17 (03), C06. <https://doi.org/10.22323/2.17030306>

2017

- Broks, P. (2017). Science communication. Process, power and politics. *Journal of Science Communication JCOM*, 16 (04). DOI: <https://doi.org/10.22323/2.16040302>
- Campus Engage (2017). *Engaged Research: Society and Higher Education Working Together to Address Grand Societal Challenges*. Dublin: HEA (Murphy, P., co-author). A publication of the Irish Universities Association and the Irish Research Council.

PRESENTATIONS

2019

- Dijkstra, A. M. (2019, 12 June). *Science communication for teenagers: what can we learn from practices?* Lecture presented at the 2019 Beijing International Symposium on Science Communication. Science and Technology Education in the Intelligent Age.
- Dijkstra, A. M. (2019, 13 June). *The emergence of science communication in the Netherlands: what roles for researchers?* Lecture presented at the BEIHANG University. Workshop for students and scientists.
- Dijkstra, A. M. (2019, 14 June). *Popularizing science in museums: Engaging teenagers in science*. Lecture presented at the Science Salon: Theory and Practice for popular science in museums, Elk Museum Beijing.
- Haworth, P.S. (2019). *From here to where? #LivingRRI – a case study*. Presentation SAIAB Seminar Series, Grahamstown/Makhanda (ZA).
- Haworth, P.S. & Mkansi, S. (2019). *Progress on the Nucleus Project & Way Forward - SAIAB #LivingRRI - a case study*. NRF Science Engagement Forum, Magaliesburg (ZA).
- Limson, J. & Haworth, P.S. (2019). *Science is listening*. Experimental science café event at Scifest Africa, Grahamstown/Makhanda (ZA).
- Duca, E. (2019). ERN Meeting, St. Andrews, Scotland, United Kingdom, Session called "Responsible Research and Innovation".

2018

- Baralić, D.J. & Šegan-Radonjić, M. (2018). *May Month of Mathematics* M³. Poster Session presented at US-Serbia and West Balkan Data Science Workshop, Belgrade (RS).
- Benneworth, P. & Dijkstra, A. M. (2018). *Think Tank Event: Reconnecting the university to the region of Twente*. World café meeting with regional stakeholders for the RUNIN Summerschool. Organised by RUNIN, NUCLEUS and DesignLab, DesignLab, University of Twente (NL).
- Broks, P., Mordan, C., Yin L. & Murphy, P. (2018). *The Role of Society in Science: Insights into responsibility, integrity and stakeholder values*, panel member for “Science, Stories and Society”, the 15th International Conference of the PCST Network Dunedin (NZ).
- Broks, P. (2018). *Alchemical Workshop: Transforming findings into the gold of policy and practice* Alchemical for “Living RRI: opening research to the needs and values of society”, NUCLEUS Annual Conference, Malta.
- Carrier, M. (2018). *Limited technology foresight and options left for RRI*. SciComm 100: Science communication in a democratic South Africa, University of Stellenbosch (ZA).
- Carrier, M. (2018). *Responsible Research and Innovation: Prospects and Obstacles. Integrity and Responsibility of Science: Navigating through Conflicting Social and Epistemic Demands*, Annual Meeting of the European Academy of Science, ZiF, Bielefeld (DE).
- Carrier, M. (2018). *Responsible Research and Innovation: Prospects and Obstacles*. Seventh Sino-German Symposium in the Philosophy of Science and Technology, Chinese Academy of Sciences, Beijing (CN).
- Carrier, M. (2018). *Responsible Research and Innovation: Prospects and obstacles*. Science’s Voice of Reflection Conference, Académie internationale de philosophie des sciences, Amsterdam (NL).
- Dijkstra, A. M. & Schuijff, M. (2018). *Responsible Innovation in South Africa: Meeting the needs of society*. Paper presented at the Public Communication of Science and Technology (PCST) 2018 Conference, Dunedin (NZ).
- Dijkstra, A. M. (2018). *What role is there for science communication and engagement when fostering RRI?* Paper presented at the Public Communication of Science and Technology (PCST) 2018 Conference, Dunedin (NZ).
- Dijkstra, A. M., Doran, H., Miller, S., Yin, L. & Mordan, C. (2018). *Round table session: Implementing Responsible Research and Innovation at universities. A cultural perspective*. Presentation at the Public Communication of Science and Technology (PCST) conference 2018, Dunedin (NZ).
- Dijkstra, A. M. (2018). *Current collaboration via NUCLEUS project*. VISIT at UT by CASS/NAIS. Working meeting for Visit CASS/NAIS delegation, University of Twente (NL).
- Dijkstra, A. M. (2018). *Towards a New Understanding of Communication and Engagement in Universities. Practical Lecture* (invited). Paper presented at the RUNIN Summerschool, University of Twente (NL).
- Dijkstra, A. M. (2018). *2018 Beijing Global Network of Science Festivals*. Participating in new collaboration (invited). Round Table Conference BAST 2018 for Beijing Global Network of Science Festivals, Beijing (CN).
- Dijkstra, A. M. (2018). *Responsible innovation in South Africa: Meeting the needs of society*. Presentation at the SCICOM100 Conference 2018. Science communication and democratic South Africa: Prospects and Challenges, Stellenbosch University (ZA).
- Dijkstra, A. M. (2018). *Scientific knowledge and scientific literacy in relation to responsible innovation*. Paper presented at the World Conference on Science Literacy, Beijing (CN).
- Dijkstra, A. M. (2018). *Enhancing a responsible science-society relationship in global perspective*. Paper presented at the Science & You Conference 2018. Knowing, Caring, Sharing: New insights for a diverse world, Beijing (CN).
- Duca, E. (2018). Living Knowledge Conference, Budapest, Hungary, “A Nuclei of Citizen Science”.
- Duca, E. (2018). PCST Conference, Dunedin, New Zealand, Session called “Art of Engagement”.
- Duca, E. (2018). Russian Academy of Sciences, Moscow, Russia. Talk called “Transforming how research is performed”, 14 December, 2018.
- Gatzlaff, M. (2018). *Views of European Responsible Research and Innovation (RRI) – Insights from NUCLEUS Project*. Seventh Sino-German Symposium in the Philosophy of Science and Technology, Chinese Academy of Science, Beijing, (CN).
- Gerber, A., (2018). *Rethinking Openness in Science: Systemic Implications of Reintermediation Replacing Mechanisms of Transparency*. EASST 2018, Annual Conference of the European Association for the Study of Science and Technology, University of Lancaster (UK).
- Gerber, A., (2018). *Scicomm researchers and science communicators – bridging the divide*. ESOF EuroScience Open Forum, Toulouse (FR).

- Gerber, A., (2018). *Mapping and Measuring the Inclusiveness of Citizen Science*. Living Knowledge Conference, Budapest (HU).
- Gerber, A. (2018). *Policy dimensions of upstream engagement: reflections on systemic change towards transdisciplinarity*. PCST World Conference 2018, Dunedin (NZ).
- Gerber, A. (2018). *Tackling transdisciplinarity: pathways for systemic change*. Keynote, German RRI Summit, Ruhr-University Bochum (DE).
- Gerber, A. & Martin Segura, D. (2018). *Caravana por la Comunicación Ciudadana de la Ciencia*. Workshop Series and other public talks on Upstream Engagement in Argentina, Costa Rica, and Mexico.
- Gerber, A. (2018). *Trust in Science: the shared responsibility of managing expectations*. European Researchers Night, Erasmus University Rotterdam (NL).
- Gerber, A. (2018). *Informal science education in the bigger picture of science in cultural contexts*. Israeli Institute for Technology / Technion, Haifa (IL).
- Gerber, A. (2018). *Managing Shared Responsibilities in Science Communication: Universities and their Socio-political Environment*. Keynote at Gothenburg Science Festival (SE).
- Gerber, A. (2018). *Towards more socially robust research: Entering the era of evidence-based science communication*. Karolinska Institute, Stockholm (SE).
- Gerber, A. (2018). *The (Garden?) Pathways to Impact: Evaluation Challenges for Social Robustness of Science*. Symposium at the School for Advanced Studies on the “The changing nature of science between commercialisation and flawed metrics”, Trieste (IT).
- Haworth, P.S. & Mkansi, S. (2018). *NUCLEUS Into Action!* NRF Science Engagement Forum – SAEON Fynbos Node, Kirstenbosch, Cape Town (ZA).
- Haworth, P.S., Limson, J. & Rayner, R. (2018). *Responsible Research and Innovation - What role can science communicators play?* Think!Shop presentation, Scifest Africa, Grahamstown (ZA).
- Haworth, P.S., Limson, J., and Rayner, R. (2018). *Responsible Research and Innovation - How can art help science?* Film & Ideas – cooperative workshop presentation - National Arts Festival, Grahamstown (ZA).
- Haworth, P.S. & Mkansi, S. (2018). *H2020 Responsible Research and Innovation Networked Globally*. Presentation at DST-UNESCO Engineering Conference, Cape Peninsula University of Technology, Cape Town (ZA).
- Haworth, P.S. & Murray, T. (2018). *Conference poster SAIAB #Living RRI*. NUCLEUS Annual Conference, Valetta, Malta (MT).
- Haworth, P.S. (2018). *Living RRI: Insights from an Embedded NUCLEUS in South Africa*. NUCLEUS Annual Conference, Valetta, Malta.
- Haworth, P.S. (2018). *Who's who? Examining prevailing notions of 'agents' and 'recipients' in communication*. National Coordinating Centre for Public Engagement (NCCPE) Engaging Environments Symposium, Bristol (UK).
- Haworth, P.S. (2018). *Beyond Science Awareness - Embedding Responsible Research and Innovation (RRI) in the research agenda*. Presentation at the SCICOM100 Conference 2018. Science communication and democratic South Africa: Prospects and Challenges, Stellenbosch University, Stellenbosch (ZA).
- Haworth, P.S. (2018). *Embedding Responsible Research and Innovation (RRI) in the research agenda*. SAIAB Scientific Advisory Committee Meeting, 21-22 November 2018, SAIAB, Grahamstown (ZA).
- Marković, Z. & Šegan-Radonjić, M. (2018). *Participation of the Mathematical Institute SANU in NUCLEUS project*. Poster Session presented at US-Serbia and West Balkan Data Science Workshop, Belgrade (RS).
- Marković, Z. (2018). *New Understanding of Communication, Learning and Engagement in Universities and Scientific Institutions*. MISANU participation in Horizon 2020 project NUCLEUS, Presentation at RRI Info Day, Belgrade (RS).
- Moss, K. & Brown, C. (2018). *Implementation and Evaluation – Embedded Nucleus Case study NTU*. Malta NUCLEUS Conference Malta.
- Moss, K. & Brown, C. (2018). *Case Study for an Embedded Nucleus Insights from Nottingham Trent University*. Presentation at the Horizon 2020 Project Review Meeting for NUCLEUS – Brussels (BY).
- Rea, H. (2018). *Public engagement beyond public lectures!* Beltane Public Engagement Network. Presentation. SAIAB, Grahamstown (ZA).
- Rayner, R. (2018). *Optimism for Science Communication in South Africa – a comparative story and NUCLEUS - an introduction to SAASTA's role as a consortium partner on the NUCLEUS Project and SAIAB's selection as a case study for RRI in South Africa*. Presentation, SAIAB, Grahamstown (ZA).

- Roberts, A., Moss, K. & Brown, C. (2018). *Why does Responsible Research and Innovation matter to you?* Poster presentation at STAR conference - Nottingham (UK).
- Sonntag, H. J. (2018). EUSEA Conference, Madrid, Spain, "A socially relevant university: RRI Hurdles in Malta" (MT).

2017

- Broks, P. (2017). *Making Upstream Mainstream*" panel on RRI for "Science, Technology and Humanity" the 11th annual Science in Public conference, Sheffield (UK).
- Broks, P. (2017). *Responsible Research and Innovation: the six cultures* for "Trends in science journalism and RRI", Erasmus MC, Rotterdam (NL).
- Broks, P. (2017). *"Ethical Issues in Science Communication"* invited paper for ITMO University, Saint Petersburg (RU).
- Dijkstra, A. M. & Schuijff, M. (2017). *Comparison between South Africa and Europe in matters of RRI: findings from an international case study* (invited). Paper presented at the ZiF Conference Responsible Research and Innovation: Coming to Grips with a Contentious Concept, ZiF Bielefeld University, Bielefeld (DE).
- Dijkstra, A. M. & Schuijff, M. (2017). *RRI at the University of Twente*. Presentation at the NUCLEUS Working group meeting Belgrade, Belgrade (SR).
- Dijkstra, A. M., Schuijff, M., Yan, S., Yin, L., Zheng, N., He, W. & Nukeri, J. (2017). *Crossing Borders, Transcending Boundaries: Results from the Cross-Cultural Adaptation of the Interdisciplinary Study*. NUCLEUS Annual Conference 2017, Hannover (DE).
- Gerber, A. (2017). *Construyendo puentes desde la diferencia: Hacia una red global de la comunicación pública de la ciencia*. 15th Conexiones Congreso, RedPOP, Buenos Aires (AR).
- Gerber, A., (2017). *Transdisciplinarity at the Heart of Scientific Culture*. International Symposium on the Culture of Science, Beijing (CN).
- Gerber, A., (2017). *Making Upstream Mainstream*. Science in Public Conference, University of Sheffield (UK).
- Gerber, A., (2017). *Communication as the Key for Managing Shared Responsibilities*. Interdisciplinary RRI Conference, Bielefeld University (DE).
- Haworth, P.S. (2017). *How marketing departments can assist with academic research in higher education institutions - Working towards a New Understanding of Communication, Learning and Engagement in Universities and Scientific Institutions*. MACE (Marketing, Advancement & Communication in Education), Eastern Cape Regional Workshop, University of Fort Hare, East London (ZA).
- Haworth, P.S. (2017). *Planning for Change. Responsible Research and Innovation. Insights from NRF-SAASTA-SAIAB*. NUCLEUS Annual Conference, Hannover (DE).
- Mordan, C., Rea, H., Doran, H., Skeldon, K. & Dijkstra, A. (2017, 5-6 October). *From Concept to Reality: The NUCLEUS Implementation Roadmap*. Presentation at the NUCLEUS Annual Conference 2017, Hannover (DE).
- Moss, K. & Brown, C. (2017). *Planning for change. Insights from Nottingham Trent University*. Presentation at the NUCLEUS Annual Conference 2017, Hannover (DE).
- Schuijff, M. & Dijkstra, A. M. (2017). *Updates on the Cultural Adaptation Study. Work package 3*. Presentation at the Review Meeting for Project NUCLEUS – REA Brussels (BY).
- Schuijff, M. & Dijkstra, A. (2017). *Planning for change. Insights from the University of Twente*. Presentation at the NUCLEUS Annual Conference 2017, Hannover (DE).
- Carrier, M. (2017). *Responsible Research and Innovation: Prospects and Obstacles*. Conference on Responsible Research and Innovation, ZiF, Bielefeld (DE).
- Dijkstra, A. M. (2017). *How to understand the changing science-society relationship?* Invited lecture for Honours students Life Sciences, University of Utrecht (NL).
- Dijkstra, A. M. & Schuijff, M. (2017). *Understanding the science-society relationship: from a communication perspective*. Colloquium Communication Science, Enschede, University of Twente (NL).
- Dijkstra, A. M. (2017). *New perceptions on participation in science communication for scientific research institutes* (invited). Lecture at the 2017 Beijing International Symposium on Science Communication. Science Communication of the "Belt and Road", Beijing, Institute of Physics (CN).

- Dijkstra, A. M. (2017). *Informal Science Communication to the Public: Science Cafés as an Example*. Training on International Science Communication Approaches (invited). Workshop at the 2017 Beijing International Symposium on Science Communication: Science Communication of the “Belt and Road”, Beijing, Institute of Physics (CN).
- Dijkstra, A. M. (2017). *Science journalism: Balanced reporting and alternative facts* (invited). Lecture at the MCEC Annual Meeting 2017, University of Twente (NL).
- Dijkstra, A. M. & Schuijff, M. (2017). *Recommendations from the Cross-Cultural Adaptation Report*. Presentation at the Working group Meeting Developing Recommendations for the Implementation Roadmap, Bielefeld University, Bielefeld (DE).
- Dijkstra, A. M. & Schuijff, M. (2017). *Recommendations from the Cultural Adaptation Study*. Presentation at the NUCLEUS Working Group Meeting Belgrade, Belgrade, (SR).
- Gerber, A. & Skeldon, K. (2016). *What do you think makes for responsible science and its communication?* 14th PCST World Conference, Istanbul (TR).
- Marković, Z. (2018). *New Understanding of Communication, Learning and Engagement in Universities and Scientific Institutions*. MISANU participation in Horizon 2020 project NUCLEUS, Presentation at RRI Info Day, Belgrade (RS).
- Moss, K. & Brown, C. (2018). *Implementation and Evaluation – Embedded Nucleus Case study NTU*. Malta NUCLEUS Conference Malta.
- Moss, K. & Brown, C. (2018). *Case Study for an Embedded Nucleus Insights from Nottingham Trent University*. Presentation at the Horizon 2020 Project Review Meeting for NUCLEUS – Brussels (BY).
- Rea, H. (2018). *Public engagement beyond public lectures!* Beltane Public Engagement Network. Presentation. SAIAB, Grahamstown (ZA).
- Rayner, R. (2018). *Optimism for Science Communication in South Africa – a comparative story and NUCLEUS - an introduction to SAASTA’s role as a consortium partner on the NUCLEUS Project and SAIAB’s selection as a case study for RRI in South Africa*. Presentation, SAIAB, Grahamstown (ZA).
- Roberts, A., Moss, K. & Brown, C. (2018). *Why does Responsible Research and Innovation matter to you?* Poster presentation at STAR conference - Nottingham (UK).
- Sonntag, H. J. (2018). EUSEA Conference, Madrid, Spain, “A socially relevant university: RRI Hurdles in Malta” (MT).

2016

- Gerber, A. & Skeldon, K. (2016). *What do you think makes for responsible science and its communication?* 14th PCST World Conference, Istanbul (TR).
- Gerber, A. (2016). *Panta rhei: Facing the Changes in Science Communication Today*. Comm4Science Conference, German Cancer Research Center, Heidelberg (DE).
- Gerber, A. (2016). *Demystifying RRI: Towards a More Anticipatory Governance*. Responsible University Symposium, Leuphana University Lueneburg (DE).
- Gerber, A. (2016). *Never change a running system: Wie veränderungsbereit ist die Akademie wirklich?* Responsible University Conference, University of Vechta (DE).
- Gerber, A. (2016). *Managing Shared Responsibilities in Science and Innovation Communication*. National Science-Society Conference, Belgrade (RS).
- Gerber, A. (2016). *Unlocking the Door: Communication as Key to Science and Innovation*. RVC Annual Conference, Sochi (RU).
- Gerber, A. (2016). *Opportunities and Challenges for National Public Engagement Strategies*. Public lecture, South African Agency for Science and Technology Advancement, Pretoria (ZA).
- Gerber, A. (2016). *Engaging Stakeholders at the Science/Society Interface: Trans-cultural Challenges, and Trans-disciplinary Solutions*. Public lecture, Institute for Science, Innovation & Society, Radboud University, Nijmegen (NL).
- Gerber, A. (2016). *Beyond a Public Understanding: Researching New Horizons in Science Communication*. Public lecture, Chinese Research Institute for Science Popularisation, Beijing (CN).
- Gerber, A. (2016). *Bridging the Gaps: Intercultural and Interdisciplinary Challenges in Science Communication*. Public lecture, University St. Petersburg (RU).

Murphy, P. and McDonagh, E. (2016) *Embedded RRI in Higher Education Institutions: the DCU Societal Impact Platform*, Paper presented to 7th Living Knowledge Conference, DIT, 22-24 June 2016.

2015

Gerber, A. (2015). *Responsible Research and Innovation as a Communication Challenge*. Public lecture, Beijing Association of Science and Technology (CN).

Gerber, A. (2015). *Die Verbindung von RRI und Kommunikation*. Guest lecture, Wissenschaftsladen Bonn (DE).

NOTE: The above list represents the articles and selected presentations to scientific audiences by Nucleus team members from 2015-2019. The list is incomplete and does not reflect the entire activity all the project members.

All public reports and deliverables associated with the NUCLEUS project are available at the NUCLEUS website.



 nucleus-project.eu  info@nucleus-project.eu  [@NucleusRRI](https://twitter.com/NucleusRRI)

 [/NucleusRRI](https://www.facebook.com/NucleusRRI)  [projectnucleus](https://www.instagram.com/projectnucleus)



Participants of the Embedded Nuclei Workshop April 2019 © NUCLEUS Project

THANK YOU FOR RRIING WITH US!



NUCLEUS

Grant Agreement: No. 664932

Activity acronym: NUCLEUS

Activity full name: New Understanding of Communication, Learning and Engagement in Universities and Scientific Institutions

This project was coordinated by Rhine-Waal University, Germany

Project Lead: Prof. Alexander Gerber

This document has been prepared by the Nucleus Communication team, Leane Regan and Daniela Martin in collaboration with our Embedded Nucleus and Mobile Nucleus partners, and Dr Peter Broks.

Date of publication: June 2019

Layout and design: Daniela Martin

CONSORTIUM PARTNERS

Beijing Association for Science and Technology - Bielefeld University
- China Research Institute for Science Popularization - City of Bochum -
Delft University of Technology - Dublin City University - European Science
Engagement Association - Ilia State University - Mathematical Institute of
the Serbian Academy of Sciences and Arts - Nottingham City Council -
Nottingham Trent University - PSQUADRO - Rhine-Waal University of
Applied Sciences - Ruhr-University of Bochum - Science City
Hannover - Science View - South African Agency For Science And
Technology Advancement - South African Institute for Aquatic Biodiversity
- University of Aberdeen - University of Edinburgh - University of Lyon -
University of Malta - University of Twente - Wellcome Genome Campus -
Wissenschaft im Dialog



FUNDING

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 664932.