REF2021

| **Institution:** |
| Edinburgh Napier University |

| **Unit of Assessment:** |
| Unit of Assessment 32 – Art and Design: History, Practice and Theory |

1. Unit context and structure, research and impact strategy

Unit of Assessment 32 comprises 10 submitted category A research staff at 8.9 FTE. All submitted staff are based in the School of Arts & Creative Industries (SACI) and are a part of the Art and Design Research Centre (ADRC). The ADRC comprises researchers from the departments of Design, Photography, Film and Television. Two individuals from Film and Television (**Holmes** and **Gray**) are submitted in UoA 32, but also participate in the research activities of UoA 34. In 2014 Edinburgh Napier University did not submit to UoA 32, although two researchers (**Vettese** and **Jamieson**) submitted research in UoA 36.

The focus of the ADRC in the period has been to build a dynamic and experienced art and design research group, committed to undertaking externally funded commercial research. Within this cycle the group has developed a critical mass of active researchers, has engaged in research supervision, and has built links with external commercial partners. This has led to a vibrant and sustainable research environment which has enabled a significant submission in this REF.

Unit Structure
The ADRC is one of a number of practice-based creative research groups in SACI. The Centre leads and supports research in Design, Photography, Video Arts and Performance Art. Art and design research activity occurs in four sub-disciplines:

1. **Making and Remanufacture.** This concerns the creation of innovative, sustainable materials for design. This area includes **Vettese** and **Lambert**

2. **Design for Heritage and Interpretation (including Lighting Design and Photography).** This concerns innovative artistic solutions for heritage spaces. This area includes **Innes, Winton, Jamieson, Supartono, O'Donnell, Andrews, Vettese** and **Holmes.**

3. **Graphic Advocacy and Ethics.** This concerns filmmaking and photography as vehicles for social change. This area includes **Gray, Buwert, Jamieson** and **Gerrard.**

4. **Design for Health and Wellbeing.** This includes **Gray, Winton, Jamieson** and **Vettese.**

Although nominally divided above, research in the unit takes place collaboratively and across the boundaries between the sub-disciplines. Projects are often led by funding from local industrial partners, who have identified a relevant skill set within the expertise of the group. Collaborations between staff occur often, as does co-writing of funding bids. Co-investigation on projects in the unit is common, and often involves combinations of divergent skills to respond to societal issues.

In the period, the ADRC has grown substantially in terms of staff numbers and research capacity. The ADRC has grown from 2 out of 18 staff being submitted to REF 2014, to 10 out of 32 staff submitting work to UoA32. This constitutes a significant growth in the size and productivity of the research group. The unit is burgeoning and the optimal structure is still in development.

Research Strategy
The University Strategy 2020 aimed to grow research capacity and knowledge exchange partnerships across the institution. To meet this objective SACI aimed to develop and grow each

of its creative research groups, one of which is the ADRC. As an emerging area, Unit of Assessment 32 did not outline a comprehensive strategy following REF 2014, but is has sought to grow its research capacity and increase collaborative and interdisciplinarity research, as well as increasing focus on responding to societal and cultural problems.

ADRC has aimed to identify its unique pathways to growth, reach a critical mass of researchers, and establish and develop areas of research excellence. To achieve this, the unit has sought to undertake research which is socially and aesthetically valuable, and is performed with society in mind. This has led to higher quantities of practice-led research, collaborative and interdisciplinary research, as well as development of new ties with industry.

Research capacity has been improved in the period, as evidence by the increase in research active staff in ADRC. The area now has 32 staff in total, with 10 category A staff being submitted to this REF, compared to 2 out of 18 in 2014. 5 individuals have been brought into the filmmaking and photography group (**Holmes, Gray, O'Donnell, Andrews** and **Gerrard**) to develop this area. Early Career Researchers publishing in text-based media (**Buwert** and **Supartono)** have joined this group to provide expertise and long-term sustainability. The unit has also increased its numbers of PhD completions and students. Since 2015, 12 PhD students have been recruited, with 1 having completed their studies. A staff member has also supervised a project in UoA34, and a successful MRes has completed. 2 PhD's by published works have also been won by members of staff.

The unit has also aimed to increase the quantity of practice-led research as a route to increasing impact, knowledge exchange and research funding. ADRC has sought to support researchers in undertaking this kind of research, and during the period all funded projects have involved practice in some capacity. An increase in practice-led research is also indicated by the REF submitted multi component outputs in REF2.

ADRC has sought to increase both its interdisciplinary and collaborative research, as well as its ties with external commercial partners. In this period interdisciplinary work has occurred between the ADRC and other colleagues in the fields of; Microbiology (**Vettese**, £10,000 FEC), Tourism (**Vettese,** £42,000 FEC), and Computing and Engineering (£59,000). There have also been national and international collaborations with other institutions, including; Heriot Watt University, The University of Edinburgh, The University of Sunderland, the University of Dundee, and Sejong University in South Korea.

9 Innovation vouchers were won by staff in this period, totalling £45,000. These have led to development of research partnerships with a number of industries and charities, which has in turn increased funding and grown the capacity of the centre. Funded research has subsequently occurred with a number of Scottish manufacturers and charities. Around £160,000 has been won in this period from industry, including from partners in the Scottish textile industry and Historic Environment Scotland.

This REF period has been the beginning for research within this unit. In this period the ADRC has built its research capacity, and has identified areas of excellence, but it has also identified approaches in the future which can ensure its long-term sustainability and vitality. The success of practice-led research, the positive engagement with business and industry, and interdisciplinary collaborations are key successes to take forward.

The school and unit are committed to the University's overarching research strategy as outlined in REF5a. Future school strategies are informed by the institutions five-year focus on staff development, increasing innovation, and developing international research partnerships, and aim to feed into the broad strategic aims of the University.

In the next REF period, this unit will aim to continue to grow the quantity of practice-led research. ADRC will continue to pursue industry-led collaborations and funding opportunities to lend its

expertise to the sector and ensure impactful outcomes. Different kinds of funding opportunities will be targeted, including Innovate UK Plastic Innovations grants, and Knowledge Transfer Partnerships. For example, a currently emerging KTP with The Scottish Leather Group will be provided significant support. The unit will also aim to utilise University level support from the planned Innovation Hub to facilitate this target.

UoA 32 will also seek to bring its expertise to other disciplines to undertake interdisciplinary research and lead to high quality outputs. In particular it will aim to build on ADCR's crossovers with members of staff from Film and Television. This will be done in combination within the new University theme of Culture & Communities, which will facilitate impactful society-led research.

These two strands will allow staff to network pursue grant applications with the aim of publishing in journals in other disciplines. This aligns with University and School aims to increase income, encourage cross disciplinary research supervision, and increase publications of 3 and 4 star quality.

ADRC will also look to continue to grow numbers of PhD students by promoting our knowledge base and supervision capacity more publicly, and advertising potential projects in Find A PhD. This will be done with the University level support for People, as outlined in REF5a.

Achievement and Continuation of Impactful Research
As the research is an emerging area for the University, ADRC has aimed to establish pathways to impact in this period. These have led to direct benefits, but have also developed into meaningful collaborations with longer-term implications for beneficiaries. The unit has supported researchers in growing their areas and establishing connections with external businesses and charities.

To establish these pathways, the unit has encouraged staff to use SFC Innovation Vouchers, 9 of which have been won in the period. This has allowed researchers to engage in short, industry led projects, which have developed into substantial impactful research areas. For example, **Vettese** won a voucher to explore 3-D remanufacture with textiles company Lenzing. Subsequently she has undertaken 3-D remanufacturing research with Interface and Applied Arts Scotland which has directly impacted on artists and businesses.

Once established, researchers have been encouraged to target applied sources of funding to continue their research. For example, in the period funding has been received from bodies such as; Mike Stoane Lighting £4,000, Scottish Leather Group £3,000, and The Textiles Future Forum £90,000. This approach has ensured end beneficiaries are considered in funding bids.

These strategies relate directly to the success of **Vettese's** impact case study. An SFC Innovation Voucher established her research into using 3-D printing to innovatively reconstruct waste and aesthetically 'outdated' materials. Following this, she utilised her experience and findings to seek funding and engagement from the wider textiles sector. **Vettese** was subsequently funded directly by the Textiles Future Forum to collaborate with four Scottish textile companies, Calzeat, Bute, Begg and Co, and the Scottish Leather Group. This has led to the adoption of new waste utilisation techniques by these organisations, as well as building an ongoing partnership with Scottish Leather Group, who estimate they could find a use for up to 2,300 tonnes of previously wasted material as a result of the research.

The second impact case study concerns a researcher submitted to UoA 34 (**Scott**). **Scott's** primary research interest is in film; however he was funded by an internal grant to kick-start an archival research project into Scottish feminist photographer Franki Raffles. This internal funding has allowed him to re-discover this iconic photographer, and has led to the establishment of a virtual archive, and a long-term collaboration and exhibition with The University of St Andrews Special Collections Archive. Through this, publics have been reacquainted with the work of a previously lost photographer.

Over the next period, ADRC will support research areas to build on existing connections with industry and charity. The unit aims to increase Knowledge Transfer Partnerships following their collaboration to date. For example, between **Vettese** and The Scottish Leather Group. **Vettese** is confirmed to take a one-year secondment to the organisation to facilitate a particular piece of research. ADRC will also aim to build relationships with new partners. Researchers will continue to be encouraged to build ties via Interface Innovation Vouchers, and the unit will also aim to increase its support for researchers undertaking public engagement and presentations to non-academic audiences.

Supporting Interdisciplinarity

As an emerging research area, interdisciplinarity in UoA 32 has been encouraged via development of existing networks and connections. This has strengthened ties between areas of excellence and other disciplines, which has led to successful research in the period and has initiated a lasting culture of interdisciplinarity.

Vettese has undertaken externally funded research in the period with **Singleton** (UoA7), a Microbiologist from the School of Applied Sciences, regarding the use of fungal materials as a sustainable future textile product. She has also collaborated with **Anastasiadou** (UoA24) from the Tourism Department, in The Business School, regarding 3D printing technology and visitor heritage experiences. **Jamieson** has worked with **Todd** (UoA24), lecturer in Events Management in The Business School, regarding festivals, and with Heriot Watt University's School of Social Sciences, regarding Deaf Heritage Research, funded by the Royal Society of Edinburgh (£27K FEC). These collaborations have led to co-written interdisciplinary papers submitted in REF2.

Interdisciplinarity has also been encouraged via cross-disciplinary doctoral research. Three PhD students in UoA 32 are co-supervised by colleagues from the School of Computing (SoC), and one ADRC staff member is a second supervisor for a student there. One PhD student has a second supervisor from the School of Applied Sciences, with a background in psychoanalysis and cultural theory, and one PhD student has a second supervisor from the Tourism department in The Business School. By bringing through PhD students whose research spans a number of disciplines, the ADRC has increased its own connectivity, and has ensured interdisciplinarity continues sustainably in future.

Now that the area has critical mass and links have been forged between departments, the ADRC is looking to strengthen existing interdisciplinary links and encourage new collaborations. In order to move beyond informal collaboration between disciplines the unit is planning a series of formal research 'speed dating' events and themed symposiums, led by the director of the Research Centre (**Innes**). In addition, the unit is going to encourage current interdisciplinary students to consider a future in art and design research, as well as looking to increase numbers of research students undertaking interdisciplinary research.

Strategy on an Open Research Environment and Considerations of Reproducibility

This unit and the ADRC as a whole abides by University regulations on Open Access, and ensures all media is recorded on the Worktribe data management system. Documentation of the types of creative, developing outputs submitted in this unit, such as exhibitions, performances and public facing media, have traditionally been difficult to document. However, over this REF period, the unit has worked with the University Information Management team, to ensure the system has been developed to better facilitate the group's more specific needs. The system now contains new ways of recording and storing ongoing visual research data, high resolution visual files and films, all of which can are easily and openly available.

Culture of Research Integrity
SACI has structures in place to strengthen research integrity. For most of the period, **Duff** (UoA34) has been SACI Research Integrity Director and a member of the University Research Integrity Committee (URIC). This role is now undertaken by **Hails** (UoA33). In this REF period, a school ethics committee has been set up, which includes **Jamieson** from ADRC as an ethics gatekeeper.

Research Integrity in the School has been furthered through such methods as; an online 'one-stop shop' for documents (e.g. sample consent forms) and links launched in June 2016, the 'professorial surgery', a weekly office drop-in facility for staff and research students, running since 2017, 'Research integrity roadshows', presentations about research ethics to all SACI subject groups, in the 2017-18 session, and presentations to SACI research-student workshops. Special contributions have also been made to the University Integrity Committee, including writing the University's official response to the UK Parliament Committee on Science and Technology's consultation on research integrity in February 2017.

2. People

Staff Recruitment Strategy
The key aim of the unit has been to increase research capacity via development of areas of excellence. One important aspect of the recruitment strategy has therefore been to increase numbers of researchers designated as significantly responsible for research. This unit has grown from 2 submitted staff from 18 in 2014, to 10 submitted staff from 32 in REF2021 (6 Associate Professors/Readers, 4 Lecturers). All 10 current category A staff have been appointed to positions in the ADRC in this REF period.

The unit has also attempted to recognise and promote internal staff members who have actively and successfully engaged in research. This goal has grown existing areas of excellence by providing individuals with greater independence, but has also led to effective leadership of these areas. Since 2014, 2 members of staff have been awarded Readerships, and 2 members of staff have been awarded Associate Professorships. **Cox** (Associate Professor) has been the most recent appointment, and the ADRC now has 4 members in promoted positions (**Innes**, **Holmes** and **Vettese**). This approach has yielded success in the development of research areas such as Innovative Lighting (**Innes**), and in Making and Manufacture (**Vettese**). Appointments have also been made to grow new areas in ARDC, for example, of **Supartono**, **O'Donnell**, **and Andrews** to a burgeoning research group in Photography. All are returned in this REF.

The unit has also sought to recruit staff to support these leaders and retain flexibility. 2 part-time Research Fellows were appointed in 2014 to support emerging research areas in Innovative Lighting and Ocean Plastics. These appointments provided additional support in growing these areas via external funding. **Lambert's** project '*Ocean Plastic : Developing a Model for Localised Remanufacturing'*, with assistance from Research Fellow **Vones**, won £21,000 FEC from the Carnegie Trust. **Innes**, supported by the Research Fellow **Taylor** won '*Innovative Lighting Solutions for Smart Textile Production'* £48,000 FEC from the Textiles Future Forum.

The unit has also sought to ensure long term sustainability via the recruitment and development of ECR's. 2 ECR's have been appointed during this REF period who have been submitted as Category A staff; **Buwert** and **Supartono**. **Buwert** has won internal funding, working with researchers from Glasgow School of Art on '*Testing the use of Participatory Speculative and Critical Design Methods in the Context of Deliberative Democratic Processes'* (£31,000 FEC).

Staff Development Strategy
ADRC has encouraged staff to engage in research, increasingly emphasising it as a key element of career progression, as per the university's appraisal process MyContribution.

As the ADRC has grown across this REF period, it has sought to mentor staff to encourage their development as researchers. **Vettese, Buwert, and Supartono** are research mentors and

colleagues are encouraged to contact them for support. **Vettese** has worked with practice-led researchers to 'position' their research for REF review. **Buwert** has worked closely with advising on digital platforms, and **Supartono** has advised photographers on written presentations.

Due to the emerging nature of the research in this unit, and the volume of time which creative, practice-led research can require, UoA 32 has sought to support researchers by providing extra budget for staff buy-out time. This has been allocated when needed for specific publications and visual outputs.

To support researchers in increasing the quality of their outputs, two 'mini REF' reviews, exhibitions and presentation days have taken place. Input from externals from Sheffield Hallam University in 2015 and 2017 was paid for by the unit, and provided researchers useful advice on practice led outputs and the nature of impactful research practices.

ADRC has also sought to encourage and support staff in setting up exchanges with industry and charities. As outlined earlier in this narrative, the unit supports staff in applying for SFC Innovation Vouchers to build these links, 9 of which have been successful in the period. In 2021 the ADRC will also support its first industrial secondment. **Vettese** will work for the Scottish Leather Group for two days a week for one year, to develop a particular material and set up an end of life leather innovation centre on their premises.

Members of staff undertaking practice-as-research are supported financially and through time given to exhibit their work internationally. This has allowed exhibitions as high-quality outputs, which have become part of their multi component submissions in REF2, as well as supporting creative impact. For example, in the period the unit funded **Homes, Vettese, Lambert, Andrews, Gerrard, and O'Donnell in** participating in an exhibition at Songjiang Art Museum in Shanghai.

ADRC is also committed to ensuring staff have appropriate opportunities for further education and qualification. Staff who joined the University before the requirement of a PhD have been supported to undertake PhD's, including via the PhD by Published works route. Two staff have achieved PhD's in this REF period; **Lambert** and **Firth**.

To support networking, collaboration, and dissemination ADRC has a dedicated research fund for conference attendance. Staff must bid for this money based on paper acceptance and the bearing of the conference. Several conference papers have developed to be research outcomes, or have led to networking opportunities and invited book chapter publications in the period.

The unit abides by the University's policies on research and impact leave, and for sabbaticals. Although no requests have been made in this period, the unit would be open to treating them flexibly if made in future. No fixed term staff are employed in the unit at present, but equally, ADRC is committed to treating them equitably. The unit has 5 members of staff on part-time contracts, and opportunities for them to develop are equitable with full time staff, with their protected research time being calculated pro-rata, in alignment with University policy.

Early Career Researchers
2 submitted staff members are identified as ECR's (**Buwert and Supartono**), and actions have been put in place to support them in quickly gaining research experience and independence. At the inception of their independent research careers, those identified as 'developing researchers', are given 10% of their time for research. ECR's are then supported by the three mentors in the ADRC to plan their future research activity as a part of their MyContribution process. Where necessary, the unit also supports the targeting of certain funding streams, and an increase in research time.

For example, in 2018 mentors in the unit helped **Buwer**t to identify and successfully apply for central funding to support his research into Design Ethics, so that it could become more applied

and generate empirical data. The ADRC has subsequently supported **Buwert's** teaching buy-out to undertake this research. As a result he has been able to undertake significant independent research, developing his research skills, and has been able to develop key data for future research.

Supporting Research Students
Increasing PGR numbers and achieving successful completions have been important goals for UoA 32. Due to the developmental nature of this unit over the period, the ADRC has aimed to build a vibrant PGR student community from the ground up. As such, the focus over this period has been to increase recruitment of PGR students and build a supporting culture wherein they can thrive.

In 2015 ADRC utilised the University's 50th Anniversary Fund to recruit its first full-time PhD student since 2008. This allowed the unit to develop supervision experience, and subsequently across this period the ADRC has recruited 12 PhD students (3 in full-time (3 years) and 9 part-time (5 years)). Although staff have been encouraged to advertise in Find-A-PhD, these students have primarily followed on from undergraduate and post graduate courses undertaken at Edinburgh Napier University, testimony to the success of the research led teaching. Since 2014, the unit has had 1 PhD completion (2020), and 2 PhDs are awaiting Viva. 1 MRes has completed and a member of staff have also acted as supervisor on a project led by a colleague in UoA34. Two member of staff have completed a PhD through published works.

Research Students in this unit are supported and monitored in accordance with the supervision policy of the University. The unit also benefits from the School dedicated Research Degrees Leader. The ADRC aims for all research students to have cross-disciplinary supervision should they require it for their studies. 3 PhD students are currently supervised by colleagues from the School of Computing, and 1 by a colleague from the School of Applied Sciences. This has been vital in ensuring the interdisciplinary needs of research students in this unit are met, and for students to feel as though relevant and knowledgeable advice is at hand.

Research students have a budget of £1,000 per year for conference attendance, and design students are able to use this funding for particular pieces of equipment or visual materials that may help their studies. Design students have also been supported in undertaking short research assistant roles to support their career development. For example, on particular Innovation Vouchers (**Milne, Tao**), or other funded projects (**Milne**, research assistant for Scottish Leather Group / Scottish Institute for Remanufacture) where the project remit enhances their study.

At a School level, students have access to a substantial yearly PGR student fund. SACI provides a permanent workspace shared by students across the school in Design, English, Music and Film, of which students in this unit benefit. These resources support research students in developing their skills, and help to build a vibrant PGR community.

In combination with the University Researcher Development Programme, which students in this unit are encouraged to participate in, SACI offers a series of subject specific PGR workshops led by student requirements. The intention of these activities is to ensure students graduate with essential skills and knowledge, and are prepared for their career following their PhD. Research specific sessions have covered; research design, data collection and analysis (including software training), research data management, and research ethics. Sessions also cover transferrable skills. In 2019 these included sessions on practice-based research, social media use, English language support, publishing, teaching and public speaking.

The unit has also sought to utilise and encourage external support for its research students. Edinburgh Napier University has strong links with The Scottish Graduate School for Arts & Humanities (SGSAH), and as such ADRC research students have access to their facilities and training. For example, the unit encouraged its students to consider taking part in the Scottish Graduate School of Social Science's 'Spring into Methods' course. 'Spring into Methods' is an interdisciplinary and cohort building programme, giving researchers studying for a PhD in the

Arts, Humanities or Social Sciences in Scotland the chance to apply to attend 2½-day research methods training events.

The ADRC also actively encourages its research students to work with their supervisory teams in an attempt to get published, either as a single author or collaboratively. 2 PhD students (**Milne** and **Tao**) have been proactive in identifying and participating in conferences and having their work published in conference proceedings.

PhD Student Achievements
Using the supervision and development opportunities on offer, research students in this unit have delivered and published solely or co-written papers at international conferences in this REF period. 12 publications have been written or co-written and published by Research Students.

For example, PhD candidate **Milne** has had a number of excellent successes in this REF period. She has led a number of successful research-led workshops. Her paper, '*3D-printing 'Ocean plastic'– Fostering children's' engagement with sustainability*', was published in Materials Today Communications, and won $10,000 for best paper (co-written with **Lambert** and **Vettese**). A further paper '*A study of children's' relationship with making and use of CAD in collaborative, physical and digital environments : implications for learning and open access fabrication*', was published in 'Design and Technology Education, An International Journal', co-authored with **Vettese**.

Equality and Diversity
With regards to gender, submitted staff in this unit identify as; 73% Male, 27% Female. In relation to ethnicity, submitted staff identify as 73% White, 9% Asian, 18% Unknown. 64% of submitted staff identify as having no known disability, 36% are unknown. 50% of submitted staff are on part time contracts. All submitted staff are on permanent contracts, and no staff in this unit are on fixed term or atypical contracts.

ADRC adopts University maternity and paternity leave policies, and its flexible working policy. ADRC implements the Edinburgh Napier equality and diversity agenda through university committees, and SACI is now working towards submitting for the Bronze Award for Athena Swan. While there is no policy for study leave, and no requests have been made in this period, ADRC remains open to hearing requests and flexible in responding to them.

ADRC has provided options of flexible working and unpaid leave for those with caring responsibilities in this period, and to support this, core hours are highlighted as between 10am-4pm. All though none have been forthcoming, the unit remains flexible in supporting staff with caring responsibilities to travel and attend conferences. To increase flexibility for staff, the unit is also currently reviewing the distribution of staff research time. A proposal is under consideration whereby researcher time is more flexibly consolidated into meaningful blocks towards outputs, as opposed to a blanket 20%.

The unit has no eligible fixed term staff, but does have 5 Category A part-time staff. All staff within the unit are to be provided with the same opportunity to progress career-wise as permanent, full-time staff. Part time staff are not disadvantaged in their choice to be on a research pathway, and are given appropriate time for research pro-rata as per University guidelines. The unit also follows the university's academic promotions framework in this regard. No staff have returned from periods of long term leave within this period, but the unit remains committed to being flexible regarding their reintegration.

To ensure student and staff wellbeing, the ADRC advertises and encourages the university Counselling and Mental Wellbeing facilities. This includes dedicated Disability and Inclusion staff and Dyslexia support. At a unit level, mentoring and supervisory arrangements are targeted as the best methods to support researchers and research students. There is a 'suspension of studies' option available for research students of up to six months. Suspension of studies has been taken advantage of by three research students in UoA 32 to enable them to undertake full

time meaningful work as a research assistant, to teach, and as a technical workshop assistant, which the supervisors felt would enhance their academic experience in the long term.

3. Income, infrastructure and facilities

Since 2014, this unit has received £497,266 total in external income, which is a significant amount for a first submission. This breakdown in funding is; £28,492 from BEIS Research Councils, The Royal Society, British Academy and The Royal Society of Edinburgh, £91,473 from UK based charities, £378,947 from UK government industry and other UK sources, and £3,681 EU funded research.

Average annual research income across the period is £71,038. The average annual division is as follows: 6% BEIS Research Councils, The Royal Society, British Academy and The Royal Society of Edinburgh, 1% EU industry, commerce and public corporations, 1% tax credits, 42% UK central government bodies/local authorities, health and hospital authorities, 5% UK industry commerce and public corporations, 27% UK other sources, 18% UK-based charities.

ADRC's aim is to share knowledge and ideas to benefit a wide range of stakeholders and end-users. It has sought to work with the community of practice, businesses, the public sector and local communities to deliver tangible societal impacts, and as such has sought external funding from traditional funding bodies and commercial or charity organisations.

The key underpinning priority of UoA32 for this period has been building critical research mass. In order to do this the unit has prioritised maximising its external funding, beginning with traditional academic sources such as research councils and UK based charities. Almost £120,000 has been won over this REF period from these sources. For example, £27,203 was won by **Lambert** from the Carnegie Trust for research on Ocean Plastics, and £41,563 was won by **Vettese** from the Arts and Humanities Research Council for her work on 3D printing and heritage. This funding has led to strong submitted outputs in both cases.

The unit has also targeted industry and charities for funding. In this REF period over £394,000 has been brought in from UK central organisations and industry. This has fed the research activity of the unit, but has also led to significant impact, and developed long term links with sector partners. For example, the £58,592 won by **Vettese** from the Textiles Futures Forum, allowed her to develop her research area, but also led to further collaborations with the Scottish Leather Group.

Infrastructure and Facilities
In 2016, ADRC, led by **Lambert**, won significant internal funding of £200K to complete a Maker Space. The digital fabrication facilities installed by this funding include additional specialist 3D printing and CNC cutting and reductive manufacturing equipment (i.e. upgraded laser cutters and milling machines, and a new knife cutter), plastic granulators and extruders, and additional supporting equipment and software packages to create an up-to-date, publicly facing data base. This investment furthers the strategic aims of the School to provide an excellent learning environment for our students, as well as supporting research, CPD, knowledge exchange and public engagement.

This resource has increased the quality and volume of research in the unit and will continue to supplement the vitality and sustainability of the research environment in future. The facility has the potential to attract a higher number of PhD students, as well as continuing to be utilised for workshops, challenges and symposia by industrial partners, schools and policy makers. Smaller specialist equipment has also been acquired through grants with other departments (Advanced Materials, Engineering, Microbiology) and other institutions (Heriot Watt University, Edinburgh University).

ADRC have collaborated with academics in other institutions, utilising their research facilities. **Jamieson's** project '*Deaf Heritage : Scotland's Hidden Culture*' worked directly with the Centre

for Translation & Interpreting Studies in Scotland at Heriot-Watt University. This centre, within the School of Social Sciences, is public facing, and supported the research in advising the Scottish Government's Equality Unit and Parliament's Education & Culture and Equality & Human Rights committees on language and communication issues.

4. Collaboration and contribution to the research base, economy and society

Collaborations, Networks and Partnerships
A great deal of collaborative research has been performed between ADRC and other institutions in the period. ADRC's user-led approach to research has often involved collaboration with other institutions to maximise impact.

Innes was involved in the organisation of the Heriot Watt University Illuminations research project. **Innes's** research focuses on visual, design-led lighting solutions, and combined with the more utilitarian, scientifically developed approach at Heriot Watt University, this led to improved research outcomes.

Lambert co-investigated '*Making as Growth: Narratives in Materials and Process'* with Edinburgh College of Art. This research combined **Lambert's** research into off-grid making practices, and the college's experience of workshop creation to run Research Through Design conferences at the Museum of Scotland.

Vettese and **Lambert** co-investigated '*3D-printing 'Ocean plastic'– Fostering children's' engagement with sustainability*' and **Lambert** co-investigated the Carnegie Trust Funded project '*Ocean Plastic: Developing a Model for localised Remanufacturing'* with Duncan of Jordanstone.

Lambert is now Dean of Graduate Studies at the College for Creative Studies in Detroit, and continues to be second supervisor on an ongoing PhD project (with one recent completion as second supervisor alongside **Vettese** and **Innes**). He also continues to collaborate with **Vettese** on research practice around sustainable materials and experiential tourism.

Supartono's research has involved national and international institutions, including co-authoring with the University of Sunderland and Sejong University in South Korea. He continues to research in the area of digitisation of archival photography collections.

In collaboration with **Singleton** (UoA7) from Edinburgh Napier's Microbiology Department, and working with the Scottish Company Cellucomp, **Vettese** won an Interface 'Multiparty Competition' (£10,000) for the project '*Towards Sustainable Textiles from Site-Specific Fungal Materials*'. This opened doors with continued use of materials with Cellucomp and testing facilities with Advanced Microwaving Technologies. Work on this project was then presented at the Interface/Applied Arts Scotland events '*Inspiring Innovative Sustainable Materials'* at Dundee Contemporary Arts in February 2019 and Xpo North in Inverness in July 2019, advancing further collaborative research with industry, artists, makers and academics.

Key Research Users, Beneficiaries, and Public Engagement
Engagement with research users is fundamental to research in UoA 32. A large amount of funding has been obtained directly from companies and charitable organisations to complete specific research, which has subsequently informed these organisations policies and practices.

Relationships have been built with various manufacturers through research by **Vettese**. Supported by the Interface Innovation Voucher scheme, further research has led to lasting relationships with members of the Textiles Future Forum. A number of members now work for CEED (Centre for Engineering, Education and Development), a unit of which Edinburgh Napier University is also a member. **Vettese** has been supported by ADRC to pitch at several events and projects, including her current funded research with the Scottish Leather Group. This relationship allows continues dissemination of findings to key users, and has also developed a

relationship with Scottish Leather Group which has become an Impact Case Study. This ongoing relationship is based on Scottish Leather Group's acceptance of a new material found by **Vettese**, which has become part of their innovation strategy.

Innes has continued to develop connections and projects from his previous work as a lighting designer before joining academia. His work with heritage organisations has had a beneficial impact on Scottish heritage networks, and has led to further funded projects and research outcomes. Royal Botanic Gardens Edinburgh have continued to have yearly night time lighting shows due to **Innes** and **Winton's** first event for them.

The ADRC supports projects in disseminating their findings. Broader strategies such as Interface Innovation Voucher projects, and exhibitions in Scottish galleries and museums ensure that creative research engages with end users, communities and publics. The unit also encourages researchers to perform research projects which engage publics, as in the following projects by **Jamieson**, **Buwert**, **Winton** and **Innes**.

Jamieson is lead for public engagement in SACI. In 2020 she worked on an interdisciplinary bid to win funding (£20,000) from UK Research and Innovation for the '*Seven Kingdoms of Wester Hailes'.* The project will enable members of the public to actively contribute to research and innovation projects that affect their lives. Local residents will get the opportunity to become community researchers, and get involved in a variety of place-based activities with support from researchers from across the university. The work, backed by cutting-edge technology, will include virtual reality, oral and art-based storytelling projects and the creation of a book. This project has funded several cross disciplinary projects including work with recycled plastic involving PhD candidate **Tao**, and **Vettese**.

Jamieson has won funding for '*Deaf Heritage: Scotland's Hidden Culture'*, and has proposed a new networking project to engage users and disseminate findings. This project will formalise a collaborative network of cultural institutions and researchers, whose work coalesces around the subject of Deaf Heritage. A series of events exploring Deaf Culture, heritage design, inclusivity and technology will enable the network to drive the sharing of expertise and best practice. Through collaborations between the heritage sector, academic research in BSL and design, the aim is to consider both places of Deaf Heritage and new experiential possibilities, and engage the wider public with Deaf Culture.

Buwert's research explores how deliberative democratic approaches aim to assist politicians and publics in making important decisions. Following the example of deliberative democratic exercises in Ireland which led to the referendums on same-sex marriage in 2015, and abortion in 2018, in April 2019 First Minister Nicola Sturgeon announced the proposal to establish a similar Citizen's Assembly for Scotland to explore questions about the future of the country. This research will engage Scottish communities in taking part in deliberative politics.

Innes and **Winton's** research for '*12 Closes Community Co-Design Project'* with Edinburgh World Heritage Trust involved a series of workshops. The researchers worked with a variety of publics, to develop local understandings that have underpinned their practice and gone on to form a significant part of their outputs and impact in this area. These involved: *Bakehouse Close Twelve Closes Launch event* – a public open event with invitations also sent to local residents and businesses, council members, and MSP's. 70+ people attended. *Carrubbers Close Workshop 2* – a testing of designs on-site demonstration event. *Chessel's Court Close Presentations of Designs* - a public presentation of designs at an open meeting with the public talk and a platform for feedback and discussion. *Riddel's Court Presentation of Designs to Historic Environment Scotland*. *Riddel's Court Presentation of Designs to Council*. A guerrilla lighting event built around the principles and practices of Workshop 1 for the 2015 Beltane European Researchers Night, where 28 attended. A further guerrilla lighting event built around the principles and practices of Workshop 1 for ProPEACE European Research Group, where 24 attended. A Twelve Closes presentation to JM Architects to inform their approach to surrounding designs for their new hotel at Market Street, where 22 attended. *Night of Heritage Light Guerrilla*

Lighting Event – an award-winning nationwide event exploring methods for enchanting a network of World Heritage Sites, the audience of which was nationwide, and online along with public viewing.

Wider Contributions to the Economy and Society

As well as a route to further research, working on short projects with Interface via Innovation Vouchers has had a direct impact on the wider economy and society. These projects have developed small Scottish businesses via innovation from specific academic expertise. Working on these projects also has also given research staff the opportunity to see theoretical ideas developed into practice, which has developed into 'traditional' research.

Vouchers have funded activity into open access digital making and selling platforms, interactive design and applications, new lighting approaches and collaborations with academics in Marketing, computing and Tourism. Many of the industrial collaborations have developed to become formally funded projects, which have benefitted various businesses, for example; **Innes's** work with Edinburgh Zoo and Edinburgh World Heritage Organisation, Dunbar SciFest and the Royal Botanic Gardens, and **Vettese's** research work on 3D printed Scottish Textiles.

Contributions to the Sustainability of the Discipline

Members of staff in ADRC are encouraged to raise their research 'esteem' and widen their participation in research groups through conference attendance, giving 'keynote' talks, organising workshops and taking part in group exhibitions.

Invited Keynotes, Lectures, Or Performances, and Conferences

The ADRC played a key role in the organisation of the 3rd Research through Design conference in 2017 (**Lambert**), providing one of the two general chairs (along with Edinburgh College of Art, and Edinburgh University), and 2 other committee members (**Vettese**) (along with the University of Newcastle and Northumbria University). **Lambert** continued as an organiser for RtD 2019 along with TU Delft.

Innes co-organised the Professional Lighting Design Convention's' '*The Challenge'* two-day international student speaker competition, hosted by Edinburgh Napier University in 2015.

Members of the ADRC have been keynote and invited speakers at the following: *True Colours: Explorations in Art, Design and Research*', *International Colour & Imaging 2017* (**Innes**); *Seeing Art in a New Light*', Courtauld Institute Frank Davis Memorial Lecture 2016 (**Innes**); *How Do You Make a Lighting Designer ?* Society of Light & Lighting 2016 (**Innes**); *Balancing Light: Less Light for More Effect*', Lights in Goa 2014 (**Innes**); *Presenting Cultural Heritage in the Best Light'*, Iran Lighting Design Convention 2014 (**Innes**); *3D Printing in Heritage*, Edinburgh Open Doors Day 2017 (**Vettese**), AHRC Next Generation Design Event 2018 (**Vettese**).

Supartono has been asked to be Convenor for the International Conference of Jakarta Biennale 2021, and Co-Convenor for *Art Activism of Dolorosa Sinaga* International Conference in National Gallery of Indonesia, Jakarta (January 2020) and in Indonesian Art Institute, Yogyakarta (February 2020). He has given a number of public lectures; "*The Politics of Colonial Representation and Photographic Practice in Colonial Southeast Asia*", Institute of Southeast Asian Studies (ISEAS), National University of Singapore (June 2018), "*Treasure Spots: Travel Albums and the Formulation of 19th century Southeast Asian Photographic Traditions*," in *John Thomson: Reframing Material, Images and Archives* symposium, SOAS, London (June 2018), and "*Constructing the Portrait of Southeast Asia: Pictorial and Thematic Commonplaces of 19th century Southeast Asia Photography*," in Leiden University Southeast Asia Seminar series, KITLV, Leiden (December 2017). He is a member of the Scholar Advisory Group for International Consortium of Photo Archive PHAROS 30-month pilot project (2020-2021), an Editorial Board member for peer-reviewed online journal Trans-Asia Photography Review, a reviewer for Carnegie Trust's Undergraduate Vacation Scholarship scheme (2019-present) and a Mentor for the Emerging Writer Grant programme organised by academic journal *Southeast Asia of Now* 2019-2020.

Exhibitions

Holmes's work focuses on new forms of film-making, distinct from the narrative-based moving image seen in the cinema or on television. His international work showed as part of "*Outside the Box*', at Studio 21, Kolkata, June 2015, at the Jazzfest, Dalhousie Institute, Kolkata in November 2015, at the Royal Scottish Academy Open Exhibition in Edinburgh November 2015 - February 2016, and at TMU and Miraikan the National Museum of Emerging Science and Innovation, Tokyo in April 2016.

Workshops run by ADRC staff

ADRC staff have created workshops for academics, business and the public. These include: the Science Festival workshops at the National Museum of Scotland (**O'Donnell**), Lighting Educators Workshop, Rome 2015 (**Innes**), '*The Future of Lighting Education*' Seminar, Goa 2014 (**Innes**), '*Creative Strategies for Exhibit Lighting in Conservation Environments*' aimed at experienced professional lighting designers, museum curators and conservation scientists. Light Fair International Conference Las Vegas 2014 and New York 2015 (**Innes**), 4 day residential lighting design workshops for professional Architects and Interior Designers in Lithuania: 2014 and 2015 (**Innes**), *3D Printing Souvenirs of Place and Time : The Architecture of Basil Spence*, Edinburgh architectural Fringe 2017 (**Vettese**), *Critical Making with Aluminium Sand casting*, a one day workshop at RtD 2017; and one week workshop at Estonia Academy of Arts 2016 (**Lambert**), and *Narratives of Waste : an exploration of material transformation through 3D printing* : RtD 2019 (**Lambert**).

Networks

Gerrard is founding member of WildFire Women Photographers Network in Scotland, which launched in 2017. This group is registered as a Community Interest Initiative and involves other female members of staff at Edinburgh Napier University. It has hosted many international Wildfires photographers as speakers in the Photography Lecture Series at Edinburgh Napier University (including Arpita Shah, Sylwia Kowalczyk, Margaret Mitchell, Kotryna Ula Kiliulyte, Sarah Amy Fishlock, Sylvia Grace Borda, Alice Myers, Flannery O'Kafka and Kirsty Mackay). As organiser for the lecture series **Gerrard** ensures that the photography lecture series is 50:50 male: female speakers.

Gerrard is a founding member of the Document Scotland Photography Collective. This was formed in 2012 as a collective of four Scottish documentary photographers '*brought together by a common vision to witness and photograph the important and diverse stories within Scotland at one of the most important times in our nation's history*'.

Vettese was reviewer for Train@Ed Research Fellowship Programme, Marie Sklodowska Curie Actions COFUND project.