

<b>Institution:</b> University of Cumbria		
<b>Unit of Assessment:</b> UOA32: Art and Design: History, Practice and Theory		
<b>Title of case study:</b> Cumbrian Alchemy: the influence of art practices on the management of nuclear sites and development of nuclear markers to warn future civilizations		
<b>Period when the underpinning research was undertaken:</b> 2011-2015		
<b>Details of staff conducting the underpinning research from the submitting unit:</b>		
<b>Name(s):</b>	<b>Role(s) (e.g. job title):</b>	<b>Period(s) employed by submitting HEI: January</b>
Robert Williams	Professor of Fine Art	1999-Present
<b>Period when the claimed impact occurred:</b> 2015 - 2018		
<b>Is this case study continued from a case study submitted in 2014? N</b>		
<b>1. Summary of the impact</b> (indicative maximum 100 words) <p>The collaborative art project <i>Cumbrian Alchemy</i> (CA) has influenced the discourses surrounding <i>Nuclear Cultures/Nuclear Anthropocene</i>, highlighting the role and contribution of art practices to the management of nuclear sites and in developing suitable markers to warn civilizations about nuclear waste (potentially thousands of years in the future). This has included CA contributing to guidance issued by the Nuclear Energy Agency (NEA) to reduce inadvertent human intrusion of nuclear repositories and to support future society to make informed decisions about these sites after closure (NEA members account for 85% of global nuclear capacity). Further, CA has influenced nuclear practice and discourse in Cumbria (the site of the UK's first nuclear power station), and through public engagement, has increased understanding around nuclear cultures and enhanced cultural preservation of artefacts, folklore and myths. Selection in the Arts Catalyst funded <i>Perpetual Uncertainty</i> programme, enabled CA to tour in Sweden and Belgium reaching 187,112 exhibition visitors and 11,182 through engagement/outreach.</p>		
<b>2. Underpinning research</b> (indicative maximum 500 words) <p>British artist Robert Williams and American artist Bryan McGovern Wilson worked collaboratively with Mark Dion (Mildred's Lane Projects [MLP], Pennsylvania) on the <i>Alchemists Shack</i> (R2) project, which developed a range of outcomes between 2009-2013 relating to ideas of alchemy (R2/R3), speculative fictions, oral traditions, narratives and folkloric relay (R2/R4/R5), working with 'impossible' materials such as alchemy, ghosts and 'otherworld's' (R2/R4/R5), with notions of <i>deep time</i> (subterranean, archaeological &amp; geological deposits in R2/R4/R5) and nuclearity in reference to the atomic, long-term geologic storage of nuclear waste and environmental issues (R1/R3/R5).</p> <p>Emerging from this work and research territory Williams and Wilson developed a major project in the UK – <i>Cumbrian Alchemy</i> (CA) between 2012 and 2014. Funded by Arts Council England (ACE), CA (R1) was an enquiry which uniquely drew together relational strands between the nuclear, mining and renewables industries of the north-west <i>Energy Coast</i>, with the landscape, archaeology and folklore of North Lancashire and Cumbria. The enquiry addressed issues arising from the debate concerning long-term geologic nuclear repositories, the problems of <i>deep time</i> with respect to what the international nuclear industry refers to as RK&amp;M (Records, Knowledge and Memory), and stewardship of land and place. Strategically, the project developed its archival collections to form complex relations and correspondences between the three strands of the enquiry: nuclear and other power industries, archaeological monuments, and folkloric traditions; these invoked the research and speculation about RK&amp;M, and acted out themes in relation to the different elements of the enquiry.</p> <p>With the intention of forming the basis for exhibition and publication, Williams, as part of the research phase, investigated and engaged with a number sites, including nuclear facilities at Heysham; the Sellafield training centre for vitrification; Drigg and Barrow; a variety of archaeological monuments including at Heysham; <i>Long Meg</i> (Penrith); cursus monuments at Brough; <i>Castlerigg</i> stone circle; Heysham and Halton Mesolithic sites; and castles at Lancaster and Carlisle. Dialogue with museum curators and specialists at Lancaster (City &amp; Maritime); Penrith; The Beacon, Whitehaven; Tullie House, Carlisle, and other art venues such as Florence Mine, Egremont; ArtGene, Barrow and Storey Arts in Lancaster, were followed by Wilson's residency at the Fine Art Campus (University of Cumbria) in Carlisle.</p>		

These activities led to creation of new collaborative art works featured in a series of exhibitions and talks (S8) and the publication 'Cumbrian Alchemy' (R1). Works include large scale *Diasec* photographs, a series of drawings, and sculpture involving the collection of stones from folkloric sites in Cumbria which were sent to New York, cast in Uranium glass, and presented in a studio overlooking Pupin Hall at Columbia University (where the Manhattan Project began). These were then returned to Cumbria as part of the sculpture *Ghost Stones*. A film, *Gryss-hryggr*, was produced with Mr. John Disney (deceased), Chief Guide at St. Peter's, Heysham, who narrated the *Volsunga Saga* associated with the Heysham Hogback Stone. Materials associated with the *Energy Coast*, archaeology and folklore of the region, were also collected within purpose-built archival cabinets and vitrines.

One aspect of the work speculatively enacts the American-Hungarian folklorist and semiotician Thomas Seboek's famous paper for the American Office of Nuclear Waste, the 1984 publication *Communication Measures to Bridge 10 Millennia*. Here, a 'Folkloric Relay System' uses speculative fictional narratives and oral language traditions, as well as sequences of signs and signifiers (drawing on religious traditions) to create an 'Atomic Priesthood'. This 'Priesthood' would function as a means of passing nuclear warnings to future generations. Our *Atomic Priest* (depicted and enacted by Wilson) was invoked to test Seboek's strategies for the marking of nuclear sites and repositories. We took our *Atomic Priest* around the archaeological monuments of the region as a sort of magical, alchemic tourist, adding to the repository of hermetic nuclear knowledge, which informed the construction of the art work as a whole.

### 3. References to the research (indicative maximum of six references)

- R1. Williams, R (ed.) 'Cumbrian Alchemy: Robert Williams and Bryan McGovern Wilson' (2013), edited by Williams and Wilson. Published by UniPress Cumbria, Carlisle. 96pp. 145 Full-colour illustrations. ISBN: 978-1-869979-39-3. R1 has been submitted in REF2 as a multi-component, double weighted output comprising of international exhibitions, publications, lectures and conferences.
- R2. Williams, R, 'Alchemists Shack Session I – Alchemy' (2009), part of residency at Mildreds Lane Projects (MPL), Pennsylvania, as part of *Opus Magnum: Theatrum Chemicum Britannicum*, including visiting speakers Mark Dion, Petra Lange-Berndt, Simon Morris, Sina Najafi & Graham Burnett of *Cabinet Magazine*. [www.mildredslane.com/exhibitions-press](http://www.mildredslane.com/exhibitions-press), and 'Alchemists Shack Session III – The Underworld' (2014) with visiting artists Hilmar Schäfer; Mark Dion; J. Morgan Puett; Bryan Wilson; Paul Bartow. Including performance *Dis Manibus*, directed by Williams, in which Wilson's doppelgänger 'mummy' was cremated in a speculative recreation of Roman ritual. [www.artandeducation.net/schoolwatch/77604/reassembling-time-the-alternative-pedagogy-of-mildreds-lane](http://www.artandeducation.net/schoolwatch/77604/reassembling-time-the-alternative-pedagogy-of-mildreds-lane).
- R3. Williams, R, Dion M, 'An Ordinall of Alchimy', (2010). A funded Project from *Cabinet Magazine*, organized by Mark Dion and Robert Williams, with support from Bryan Wilson & MLP Fellows. *Exhibition 1: Cabinet Magazine*: 300 Nevins Street, Brooklyn, NYC. 30.3.10 – 17.4.10. [www.cabinetmagazine.org/exhibitions/](http://www.cabinetmagazine.org/exhibitions/). *Exhibition 2: Slought Foundation*: Philadelphia, PA. 30.4.10 – 14.6.10. <https://slought.org/resources/an-ordinall-of-alchimy>.
- R4. Williams, R & Aylward-Williams, J, 'Disjecta Fragmen Communitis' (2011) featuring in Sharples, L and Dalton, C, exhibition curators: Trial and Retrieval, The World of Glass, St. Helen's. Featuring work from: Mark Dion & Dana Sherwood (USA), Gina Aylward (UK); Petra Lange-Berndt (Ger); Cornelius Holtdorff (Swe); Inken Hensen (Ger); Katrin Ostlündh (Swe); Phillipa Strange (UK/Can); Kathy Toth (Rom/Syria); Ian Wrapson (UK); Bryan Wilson (USA); Jason Simon (USA); Mark Grote (USA); Clive Parkinson (UK); Viktoria Günes (Swe); Jenny Holliday (UK). See *Projects* at [www.aylwardwilliams.com](http://www.aylwardwilliams.com); [www.worldofglass.com/files/exhib11.pdf](http://www.worldofglass.com/files/exhib11.pdf); [www.artinliverpool.com/venues-archives/world-of-glass-archive/world-of-glass-trial-and-retrieval/](http://www.artinliverpool.com/venues-archives/world-of-glass-archive/world-of-glass-trial-and-retrieval/).
- R5. Williams, R & Schäfer, H (eds.) 'Dis Manibus: A taxonomy of ghosts from popular forms' (2013), edited publication with fellows of MLP AS 2012 Session, featuring Bryan Wilson: 2013. 2pp. Fold-out art-work and essay 700mmx500mm unfolded/350x125mm folded. ISBN: 978-1-907468-19-3. Tin Type Spirit Photographs (see also R2. Exhibition *Alchemy Residuum*). [www.informationasmaterial.org/portfolio/dis-manibus-a-taxonomy-of-ghosts-from-popular-forms/](http://www.informationasmaterial.org/portfolio/dis-manibus-a-taxonomy-of-ghosts-from-popular-forms/).

**4. Details of the impact** (indicative maximum 750 words)

CA, and the associated publications, industry engagement, conferences, talks, and other academic and artistic activities, have facilitated awareness of the contribution of arts practices to nuclear sites and changed understanding around *nuclearity*, place and land amongst artists, curators, nuclear practitioners, members of the public, and across cultural and industrial sectors.

**Impact 1: Influencing the nuclear sector to utilise artistic approaches to nuclear warnings**

The long-term storage of nuclear waste is a major international concern. Some facilities such as the Waste Isolation Pilot Plant, in the US, are expected to store highly radioactive materials for 10,000 years. The potential danger of disrupting one of these sites needs to be communicated and understood by civilizations across *deep time* (time on a geologic scale), potentially thousands of years into the future. Nuclear 'semiotics' was coined by the Human Interference Task Force in 1981, and is concerned with how these messages are crafted and placed in-situ. This task is now carried forward by the Paris-based Nuclear Energy Agency (a specialised agency within the OECD) through its initiative on the Preservation of Records, Knowledge and Memory Across Generations (RK&M Initiative). The initiative began work in 2011 as part of a 'Phase 1' to 2014, and included scoping workshops, project fieldwork and studies and concluded with a major 'International Conference and Debate' in Verdun, France. Williams was invited to this conference to present work related to CA, to 168 global experts and nuclear agencies from 17 countries: "*The conference (RK&M, Verdun) is being designed more to stimulate new thinking than to report on progress... Strands of interest to the (RK&M) project include the use of visual arts... It is in this context that I am extending you an invitation to exhibit at the conference, as your varied collection could form a particularly valuable input to the discussions*" (S9).

William's contribution, as an artist, to this conference provided new opportunities for nuclear practitioners and decision makers to consider the concept of the *Atomic Priest*, and how this can serve to inform future generations about nuclear hazards (S1). Each delegate also received a copy of the CA illustrated book (R1). Subsequently, and as a result of contributions to the RK&M Initiative from a diverse group of individuals (including Williams), phase 2 was approved and funded to April 2018 to develop practical tools for implementing RK&M preservation.

The final 'tool-box', published by the OECD and NEA, contained 9 approaches and 35 mechanisms as 'Key Information Files' (S2) which nations can use as part of a 'menu' and 'systemic strategy' to preserve RK&M about radioactive waste disposal facilities. One of these mechanisms – 'Art' – states that "*Art can support RK&M preservation as it can help and stimulate the exploration of speculative futures and the visualisation of the immaterial and invisible,*" and directly cites CA through the conference *RK&M conference* proceedings p110-136 (S2). *The Nuclear Cultures Source Book*, (The Arts Catalyst/Bildmuseet Umeå) (S7) includes CA as a contributor to the RK&M debate, where CA is cited within the nuclear cultures discourse. The CA conference paper is now listed on the International Nuclear Information System (part of the International Atomic Energy Agency), which is one of the world's largest collections of published information on the peaceful uses of nuclear science and technology (S3).

**Impact 2: Raising public awareness about long-term nuclear repositories**

More recently, Williams and CA was cited as part of an article on *BBC Future* (S6i) ("*a home for slowing down, delving deep and shifting perspectives*"), and a *BBC Future Facebook* post of the article had 51 comments and 19 shares. Earlier articles in *The Atlantic* (S6ii) and *Financial Times* (S6iii) refers to CA's work in generating oral traditions around nuclear sites. These diverse publications have enabled the public to engage with the issue of long-term nuclear repositories.

It was Williams' collaboration with an Arts Catalyst Curatorial Researcher (S11) that additionally enabled curatorial objects related to CA to reach a wider audience through inclusion in the exhibition series: *Perpetual Uncertainty: Contemporary Art in the Nuclear Anthropocene* (S4), part of an Arts Catalyst Funded initiative – *Nuclear Cultures*. For *Perpetual Uncertainty*, the Curatorial Researcher (S11) selected specific artists from Europe, Japan and the USA to investigate, as part of a community of practitioners, questions of nuclear technology, radiation and the transmission of knowledge over *deep time* futures (S4).

The inclusion of CA in these significant international exhibitions and fora extends the reach of this project to audiences at internationally renowned galleries and museums. Attendance figures were significant, with associated outreach and public programmes increasing engagement and discourses around nuclear issues. A number of exhibition reviews confirmed its significance (S5). Exhibition venue visitor numbers included:

- Malmö Konstmuseum, Sweden (2018), exhibition Visitors: 49,881, Public Programmes: 973 (exhibition opened by the Swedish Deputy Prime Minister, Isabella Lövin)
- Bildmuseet, Umeå, Sweden (2016) - Exhibition Visitors: 41,236, Public Programmes: 2,029
- Z33 Gallery, Hasselt, Belgium (2017) - Exhibition Visitors: 4,878, Public programmes: 300

### Impact 3: Contributing to discussion and debate with industry, the public and practitioners

CA additionally influenced the nuclear sector in Cumbria, including Dr Paul Abraitis (S10), Director of Eden Nuclear and Environment: *"Cumbrian Alchemy has stimulated significant interest and been useful as a discussion point within Eden Nuclear and Environment's consultancy business... this work has undoubtedly widened horizons by exposing the interfaces between the sciences, which are often core to Eden NE's work, and the contemporary arts in a way that explores the relationship between the nuclear, environment and society."*

This 'relationship' is particularly important in Cumbria as the industry supports around 12,000 jobs at Sellafield Ltd., as well as via an extensive supply chain. Sellafield Ltd represents 59.4% of Copeland District's GVA, and this, coupled with Copeland's high deprivation (12.2% of Lower Super Output Areas are in the highest decile of indices of multiple deprivation), means that ways of preserving RK&M and promoting debate about nuclear more generally are important for local people. Cumbria itself has been considering a long-term nuclear waste repository for a number of years, and a series of public exhibitions (2014-2015), including at Rheged Centre, Penrith, The Beacon, Whitehaven, and Tullie House Museum, Carlisle, enabled timely public engagement around nuclear cultures at a time of contentious debate and consideration (S8).

R1 (print run 1,000 copies) has helped to improve understanding of the relationship between nuclear, folklore, and archaeology by bringing contributors from different fields who do not typically collaborate. It includes contributions from Dr David Barrowclough (Dept. of Archaeology University of Cambridge), considering the concept of *deep time* in Cumbria and the future archaeology of long-term storage of nuclear waste; Dr Paul Abraitis (nuclear practitioners with Environment Agency/Eden Nuclear & Environment) exploring the natural history of radiation in the region; and Alan Cleaver (journalist) providing cultural and local folkloric perspectives, and insights into the mythic spaces of Cumbria. The introduction is by renowned American environmental artist Mark Dion, and Nick Thurston (Information as Material, 2014) states: *"The book represents a project formed at the juncture of the speculative imaginary and a future so real not even science-fiction could foresee it."*

CA therefore highlighted the role of the arts, and in particular this *Cumbrian Alchemy* project, in offering important contributions to the speculations, debates and strategies involved in the communication of risks of extant nuclear facilities and repositories, the relationship to the communities and environment(s) living near nuclear sites; and the broader discourses of nuclearity for the near and far future.

### 5. Sources to corroborate the impact (indicative maximum of 10 references)

- S1. Williams, R (2015). 'Cumbrian Alchemy' in *Section III – Contributions from artists, and posters*. pp.111-116 in *Radioactive Waste Management and Constructing Memory for Future Generations. Conference Proceedings*. NEA No. 7259. OECD. 177 pages. *Constructing Memory: An international conference and debate on the Preservation of records, Knowledge and memory of radioactive waste across generations*. Nuclear Energy Agency (NEA) & ANDRA. Centre Mondial de la Paix. Verdun, France. September 2015.
- S2. RKM Final Report with citation of S1 p144-146 under "Information resources issued by the RK&M initiative" <https://www.oecd-nea.org/rwm/pubs/2019/7421-RKM-Final.pdf>.



- S3. CA paper within the *International Nuclear Information System* <https://inis.iaea.org/collection/NCLCollectionStore/Public/47/009/47009697.pdf?r=1&r=1> and [https://inis.iaea.org/search/search.aspx?orig\\_q=RN:47009697](https://inis.iaea.org/search/search.aspx?orig_q=RN:47009697).
- S4. *Perpetual Uncertainty* Exhibitions at; Malmö Konstmuseum. Sweden. Feb-Aug 2018. <https://malmo.se/Uppleva-och-gora/Konst-och-museer/Malmo-Konstmuseum/Utstallningar/Tidigare-utstallningar/Perpetual-Uncertainty---konst-och-radioaktivitet.html>; Z33 Gallery. Hasselt. Belgium. Oct-Dec 2017. <https://www.z33.be/en/artikel/exhibition-perpetual-uncertainty/>; *Perpetual Uncertainty*. Williams, Robert & Wilson, Bryan McGovern (2014-16) 'Cumbrian Alchemy' in Carpenter, Ele & Johansson, Sofia (Curators.) (2016) *Perpetual Uncertainty*. Bildmuseet, Umeå, Sweden. Arts Catalyst/Nuclear Cultures. October 2016-April 2017; <https://www.bildmuseet.umu.se/en/exhibitions/2016/perpetual-uncertainty/>.
- S5. *Perpetual Uncertainty* Exhibition Reviews; Mavrokordopoulou, K (2018). Review 'Nuclear (in)securities: Perpetual Uncertainty: Art in the Nuclear Anthropocene. Z33 House of Contemporary Art, Hasselt. BE.' in *Magazin für Kunst und Ästhetik*, Wien/Basel. Spring/Summer 2018. July 2018. ISSN: 2235-1604; *Helsingborgs Dagblad* 'Konsten konfronterar kärnkraft'. March 3, 2018. <https://www.hd.se/2018-03-03/konsten-konfronterar-karnkraft>; *Skånska Dagbladet* 'Minister invigde utställning om radioaktivitet'. February 24, 2018; 'Konsten konfronterar kärnkraft'. March 3, 2018 <https://www.sydsvenskan.se/2018-03-03/konsten-konfronterar-karnkraft>.
- S6. Media Coverage including i) M, Piesing (2020) 'How to build a nuclear warning for 10,000 years', *BBC Future*, August 3, 2020. <https://www.bbc.com/future/article/20200731-how-to-build-a-nuclear-warning-for-10000-years-time>; ii) Beauchamp, S (2015). 'How to send a message 1000 years in the future', *The Atlantic*, February 24 2015 <https://www.theatlantic.com/technology/archive/2015/02/how-to-send-a-message-1000-years-to-the-future/385720/>; iii) Stothard, M (2016). 'Nuclear Waste: Keep out for 100,000 years'. *Financial Times Magazine*. July 14, 2016. <https://www.ft.com/content/db87c16c-4947-11e6-b387-64ab0a67014c> and Toase, S (2014) 'Review of Cumbrian Alchemy' in *Fortean Times* FT318 September 2014. p.60. <http://ft.gjovaag.com/w/FT318>.
- S7. *Nuclear Cultures Sourcebook* Press Release <https://www.artscatalyst.org/sites/default/files/page/Nuclear%20Cultures%20source%20book%20press%20release.pdf>.
- S8. Exhibitions at: Rheged Centre. Penrith, Cumbria. 16.2.14 – 13.4.14. [http://insight.cumbria.ac.uk/id/eprint/1767/2/Cumbrian Alchemy Exhibition Information and Technical details-1.pdf](http://insight.cumbria.ac.uk/id/eprint/1767/2/Cumbrian%20Alchemy%20Exhibition%20Information%20and%20Technical%20details-1.pdf); The Beacon. Harbour Gallery. Whitehaven. 21.3.15-4.5.15. <http://museu.ms/event/details/108535/cumbrian-alchemy>; and Tullie House, Carlisle [https://www.tulliehouse.co.uk/sites/default/files/attachments/pages/tullie\\_house\\_-\\_whats\\_on\\_guide\\_-\\_pdf\\_for\\_web\\_-\\_18.4.18.pdf](https://www.tulliehouse.co.uk/sites/default/files/attachments/pages/tullie_house_-_whats_on_guide_-_pdf_for_web_-_18.4.18.pdf).
- S9. Testimonial from ex-Head of Packaging Assessment, Nuclear Decommissioning Authority, now Consultant for the Nuclear Industry on CA informing discussions at a Nuclear Energy Agency conference. [Corroborator 1].
- S10. Testimonial from Director of Eden Nuclear and Environment on CA influencing the nuclear sector in Cumbria. [Corroborator 2].
- S11. Testimonial from Curatorial Researcher with Arts Catalyst on CA contributing to the series of *Perpetual Uncertainty* exhibitions, part of *Nuclear Futures*, funded by Arts Catalyst. [Corroborator 3].