

Creativity and Curiosity: Exploring the Space Between Artists and Astronomers

Gillian McFarland and Ione Parkin

Creativity and Curiosity is an international art-science project led by UK contemporary visual artists, Gillian McFarland and Ione Parkin, working in connection with astrophysicists, cosmologists and planetary scientists from a wide range of universities and institutions. The artists have developed a body of work in relation to their ongoing dialogue with space researchers. Through creative enquiry into the dynamic forces of the universe this artist-led project explores the nature of interdisciplinarity within the practice of visual thinking. All the artworks referred to in the text can be found on www.creativityandcuriosity.com.

Introduction

Parkin and McFarland have engaged in dialogue with a broad range of space researchers, gathering inspiration from specialist areas including planetary atmospherics, galaxy formation, supernovae, dark energy, meteorites, solar dynamics and cosmic dust. Conversations with astronomers at the University of Leicester in 2016 led to further engagement with the Institute of Astronomy (Cambridge), Imperial College London, University of Birmingham, Cardiff University and further afield to the University of Amsterdam, CAMRAS Dwingeloo Radio Telescope (The Netherlands) and Leibniz Institut Für Astrophysik (Potsdam, Berlin). As a result of these interactions the artists embed the science fully into the realm of art, aware of the importance of staying rooted in their authentic practice as artists and giving space to both emotional and cognitive dimensions of understanding.

All of us involved with the Creativity and Curiosity project are interested in something that transcends our perceptions and explores the realm of what is possible, with the grand beauty of the universe acting as a source for our inspiration.

(Prof. A. Triaud, University of Birmingham)¹

Artists and astronomers are trained observers, kindred spirits from different disciplines, distilling

meaning from visual information, experiments and ideas, converting this into scientific concepts and aesthetic truths. McFarland and Parkin are expressing a lateral response to the scientific research – a physical, tactile experience. Parallels of process have emerged between the artists and scientists – an excitement about uncertainty, ambiguity and anomaly – a desire not just to observe but to look beyond. The collaborating astronomers' insights into the artwork are shared through written responses which are gathered and accompany the artworks at project exhibitions.

In order to study historical perspectives on astronomical investigations, Parkin and McFarland undertook research visits to the archives at the Royal Astronomical Society and the Science Museum, viewing original drawings by the German-British astronomer William Herschel (1738-1822); photographs by Warren de la Rue (1815-1889), the British astronomer, chemist and inventor who pioneered of the art of astronomical photography; the Cloud Chamber images of the Scottish physicist and meteorologist, Charles Wilson (1869-1959); and the moonscape plaster casts of James Nasmyth (1808-1890), the Scottish engineer and illustrator of a publication on lunar geology.²

The project has enjoyed many highlights including an exhibition and curated talks at the Hebridean Dark Skies Festival 2020 and the Moon50 events at Glasgow Science Centre. An invitation to exhibit physical artwork at the Zeiss-Grossplanetarium for Berlin Science Week (2018) resulted in the immersive experience of projecting high-resolution digital images of the artwork onto the planetarium dome. Further full-dome projections have been displayed at the Peter Harrison Planetarium (Royal Observatory Greenwich, 2019) and the Sir Patrick Moore Planetarium (Leicester, 2022). Translating the artwork itself into another medium blends otherwise static pieces into a gently rotating transcendent experience for new audiences.

Ione Parkin

Parkin's paintings express her fascination with the early formation of the universe; massive clouds of cosmic dust and gas; the filamentary structure of vast webs of colour and shimmering light; luminous visions of immensity; the notion of scale invariance; and how the raw beauty of astronomical entities can be produced by such violent and extreme processes.

In the larger paintings on canvas she explores a layering of mark-making processes which almost suggest the evidence of past states of matter – of dust and gas and light – of the co-existing dynamics of creation and destruction driving the life-cycle of matter itself. These are paintings that need to be watched for a while, giving your eyes time to adjust to their night-vision – a sense of the sustained gaze.



Fig.1 Ione Parkin, *Turbulence*, 2019, oil & synthetic resin on canvas, 127 x 102cm, artist's collection.

After a while, the observer has the sensation that the surface of the canvas vaporizes and we enter into the painting, becoming almost a weightless witness looking from a suspended viewpoint. There is a sense of each painting being part of a greater whole – a fragment of infinity – a sense that each image could continue way beyond the confines of the canvas itself.

Paintings such as the *Liminal Phenomena* series (2016-2017, oil on canvas, artist's collection) have been described by some of the astronomers as being reminiscent of highly star-forming regions that contain a lot of dust and clouds of molecular hydrogen. *Turbulence* (2019, Fig. 1) has inspired the following interpretation:

This reminded me immediately of the rich blend of colours, swirls and eddies that we see in Jupiter's ever-changing atmosphere. This churning atmosphere reveals bright plumes of ammonia gas (white), rising above the browns and reds of the background clouds. I think of the wispy whites and greys as high cirrus-like clouds, placing a veil across the turbulent and dynamic weather of the deeper atmosphere, layers upon layers of fluid flows that all collide, collapse and swirl about one another. Trying to find order within this chaos is part of the ambition of planetary atmospheric science.

(L. Fletcher, Professor of Planetary Science, University of Leicester)³

Parkin is interested in how astronomers are, in a sense, code-breakers – decrypters of light. They use different wavelengths of light in order to glean specific information and they will use false colours in order to perceive patterns that are otherwise harder to distinguish. In the spirit of playful provocation, she adapted the digital image of *Rising Form* (2019, oil on canvas, artist's collection) into its negative version and a saturated colour version, inviting the astronomers to speculate on what difference the altered colour makes to the astronomers' interpretation of the image. This initiated responses relating to vast differences in scale and temperature e.g. low mass star forming regions, or on another scale altogether:

The icy surface of a freezing cold exoplanet is penetrated by volcanic eruptions caused by tidal heating of its interior. These eruptions blast through the surface spewing dust and ash into the exoplanet's atmosphere. Much of this material will escape the planet's gravity and drift into interstellar space.

(Dr N. Libeskind, Leibniz Institut Für Astrophysik, Potsdam, Germany)⁴

Solar Resonance (2019, oil on canvas, artist's collection) was inspired by conversations with the solar physicist, Dr H. Mason (Department of Applied Mathematics and Theoretical Physics, University of Cambridge). The painting radiates the intense heat and turbulent motion of super-heated plasma – the fast nuclear burning of hydrogen, creating other elements like helium. On first glance this painting has a homogeneity to the surface but on closer observation you begin to sense the tonal differentiation and seething restlessness of the image. Parkin wanted a sense of the painting being illuminated from within and the tendrils of light twisting into an ever-changing, convoluted, intertwining mass of intense energy.

Heavy Metals (2017, private collection), a mixed media work on paper involving ink, PVA, acrylic, enamel, powdered Iron Oxide pigment, powdered oxidised copper and graphite, is part of a group of works evocative of planetary surfaces and the dynamic processes of extreme heat, compression and chemical reactions of raw elements. A restless process-driven image, this painting is richly textured through the tactile exploration of materials and the physical fracturing and compacting of the surface. She has layered various inks, raw caput mortuum pigments and a thin layer of powdered oxidised copper on the surface of the artwork – a metallic glint that hints at the presence of other elements. The observer looks down on these surfaces as if prospecting from orbit.

In the mixed media painting, *-210 Degrees Celsius* (2019, Fig.2), Parkin has created a texture which implies the features of glacial ravines and fissures. A surface which echoes the hyper-cold regions of other planets and suggests a cyclical history of fracturing and thawing. Dr T. Haworth (QMC London) sees here 'block outcrops, ridges, troughs, furrows, hollows, plateaus and icy plains'.⁵ The title refers to the freezing and melting point of Nitrogen and we can imagine vast oceans across a frozen world in the depths of planetary chill.

For me, *-210 °C* and *Otherworlds* are like the surface of a planet that has been shaped by ice or tectonic activity. You can see valleys and peaks, rifts and chasms. Looking very closely you can even see cracking that could be associated with fractures in an icy surface. It really reminds me of some of the images of the surface of Pluto from the New Horizons probe. Even as a 2D digital image, it almost feels like you can reach out and touch the features in relief.

(Dr M. Fraser, University College Dublin)⁶



Fig.2 Lone Parkin, *-210 Degrees Celsius*, 2019, mixed media on paper, 90 x 120cm, artist's collection.

In *Mars Study II* (2019, Fig.3 detail) Parkin worked solely from the reverse of the paper to simulate the impact of subterranean forces on the visible surface. In the southern polar regions of Mars, intricate and unique textures are formed as ice sublimates in the slightly thicker and warmer atmosphere. Veins of rust colour cut through the white of the paper surface – like the iron-rich earth which is visible through cracks in frozen carbon dioxide at the South Pole of Mars – revealing white bulging formations, like pillowy mounds of ice.

Parkin is interested in conveying extremes of temperature. *Sulphur Crust* (2018, mixed media on paper. Collection: Birmingham Business School) is inspired by the sulphur-rich environment of the intensely volcanic moon of Io one of Jupiter's moons. It expresses a chemical cocktail of different elements which are combining, mixing and reacting with each other, creating an image that could be a solid surface or a toxic gaseous environment. She creates a sense of intense geothermal activity, a hot sulphuric young world – turbulent, active and violent:

The surface of this planetary body appears to have been coated in a yellowish substance, perhaps the result of sulphur-rich volcanic eruptions on the surface of Io, or maybe material settled onto the surface of a colder world through cryovolcanism.

(Dr C. North, Cardiff University)⁷

Parkin's mixed media paintings are speculations on undiscovered terrain; retrieving samples of flayed planet-skin; contemplating the awe-inspiring beauty of the cosmos; experiencing – sensing – the tactile physical presence of an unreachable reality. The canvases behave differently, inviting the observer to look down onto swirling turbulent movements, vast distances and nebulous, coalescing cloud-like forms. Her paintings come into being in the solitude of the studio – her creative laboratory – through a gradual unravelling of threads of thought, absolute engagement in the physicality of the painting process and a sifting of internal connections and external references. She is creating her own blend of materiality and atmospherics in response to the vastness of the cosmos.



Fig.3 Lone Parkin, *Mars Study II*, 2019, mixed media on paper, 54 x 50cm, private collection.

Gillian McFarland

Throughout the project McFarland has developed a collaborative model of co-creation exploring the loosening of disciplinary boundaries and the porous nature of shared questioning. She is interested in the materiality of the mediums she works with and the narratives within process.

McFarland works with the glassblower, Graeme Hawes (G. R. Hawes Glass, Leicester) to produce

multiples of spun 'space globes' (*Glass Orb*, 2020, Fig.4). These embody ideas around extremes: of heat, rotation, gravity, expansion and collapse. Silver nitrates, sulphur and coloured frits are added which then disperse across the surface in patterns driven by process rather than design. The process has pushed form and colour outwards into a new sense of order.

These globes are beautiful, translucent forms which can be held in one's hands in



Fig.4 Gillian McFarland, *Glass Orb*, 2020, blown glass and nitrates, 30cm diameter, private collection.

contemplation of planetary bodies, gas giants or the wonder of the universe which has found an echo expressed in a human artefact. Gathered together in multiples they trigger a complex interplay of reflections and refracted light creating a tangible sense of the connections within a web of galaxies.

McFarland shared the glass-blowing process with the exoplanetologist Prof. A Triaud, involving him actively in the co-creation of glass globes. Through this hands-on collaboration they discovered the 'space between' their corresponding interests in planet formation – playing with sensory extremes, facing danger, fear, the big unknown, the endless possibilities.

Astronomy is usually a passive science. The object of our study is far removed, further than most humans can comprehend. We never get to touch it. Gillian invited me to play with pigments and to propose ideas...how to explore various processes that happen in planetary atmospheres. This became an opportunity to imagine something and figure out whether it can be created. As with everything once you try you learn.

(Prof. A. Triaud, University of Birmingham)⁸

The process of observing, noticing discrepancies and inaccuracies, looking for structures, patterns and meanings inform both artists and scientists. McFarland engaged with the processes of

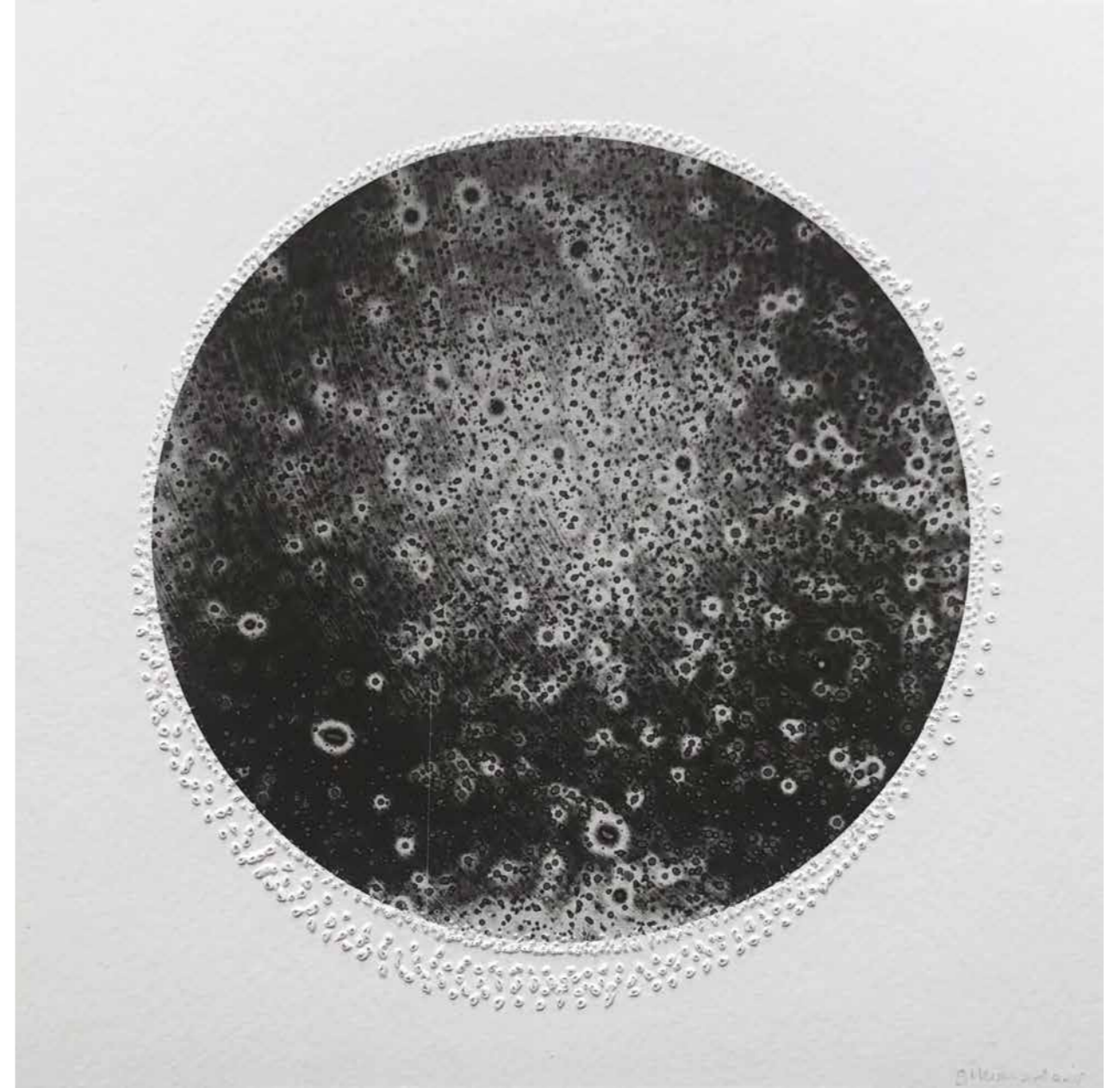


Fig.5 Gillian McFarland, *Flat Fields*, 2020, print on Bockingford Paper, 30 x 30cm, etching and punctured paper, private collection

interpreting data with Professor Triaud. The series of black and white prints entitled *Flat Fields* (2020, Fig.5) are created from photographs that he takes to calibrate his camera. Astronomers open their telescopes during dusk and dawn when the sky becomes bright and illuminates their cameras uniformly. If there is anything along the light's pathway through a telescope, it will make an imprint. These imprints are called 'flat fields' and can hide valuable scientific information. McFarland was drawn to this process and its outcomes, imagining this ritual being played out by astronomers all over the world opening and closing their mirror eyes, orchestrated through spinning time. She transferred these Flat Fields into prints and 'transmuted them from technical

data to pieces containing the essence of planetary, nebular, galactic, cosmological and biologic phenomena. They have a new reality and carry whole new meanings' (Prof. A. Triaud, University of Birmingham).⁹

McFarland refers to astronomers' use of differing wavelengths of light through her Uranium Glass Globes. She adds trails of uranium glass during the glasswork process. The uranium glass is invisible until ultraviolet light is directed onto it. This causes certain compounds within the globe to shine brightly due to fluorescence. The uranium glass glows, showing the threads of colour embedded in the form, drawing attention to the different light waves used to discern distant objects.



Fig.6 Gillian McFarland, *Units of Time*, 2018, collagraph with rust on paper, 60 x 60cm, artist's collection

Her interest in the nature of gathered and recorded data and how these can be interpreted by researchers and artists has led her to experiment with environmental, mechanical and human mark-making. She invites reflections on the different emotional responses these marks can evoke.

When we send our robotic spacecraft out into the distant realms of the solar system, we are always trying to interpret what they see with their electronic eyes in terms of what we are familiar with. We inject our human experience over the scientific data in an attempt to understand what we are seeing.....when those robots finally meet their end (as Cassini did in 2017) it evokes feelings of loss.

(L. Fletcher, Professor of Planetary Science, University of Leicester)

McFarland is engaged in an unending process of mapping understandings of ourselves *onto and through* place and *across* time, attempting to construct or deconstruct what is known, what is assumed and what is real. Deep mapping uses testimonial imagination precisely in this way – to animate the possibility of collective self-understanding across different worlds so as to *recount* and *reconfigure*. In the *Units of Time* series (2018, Fig.6) McFarland explores possibilities of recording data relating to the passage of time. She places a large circular metal plate outside for a whole lunar cycle to be worn by time and weathered by the elements, using the development of rust on the surface to provide the visual data. The rust has been printed onto the surface of the paper, creating the darker patches suggestive of the mapping of planetary surfaces.

Similarly *Discrete Points* (2017, punctured Bockingford paper, private collection) brings to mind the tracking of some distant icy object and the plotting of its orbit across otherwise untouched space where the concentric rings of discrete points are much like the features of dust grains being observed in protoplanetary discs. Circulating bands of rock, ice and other particles rotate continuously until they gradually become drawn together. These images have a touch-sensitivity to them – an almost braille-like quality as if we are being invited to perceive the unseen. They are quiet contemplations on celestial mechanics, on time and space wrapping around itself in a rhythm of repeated action.

Art and science have a long and interrelated history. Through their dialogue with space researchers McFarland and Parkin share a fascination with processes of creation whether on a cosmological scale – the meta-narrative of the life-cycle of matter itself – or on a human personal scale through the creation of artwork. Curiosity is the prime driver – the desire to explore the ambiguities found within a broader pattern of order and to keep alive to a sense of wonder. This project sits in that 'curious space between wonder and thought – a space where there is no single Disciplinary (in an academic sense) voice' (G. Finn).¹⁰ The feminist philosopher, Geraldine Finn, calls this space 'the space-between, between representation and reality, language and life, category and experience'.¹¹ The following observation by the late Professor John Brown, 10th Astronomer Royal for Scotland, exemplifies the profound response from the scientific community to the artwork and the effectiveness of the art-science dialogue Parkin and McFarland seek to inspire and provoke:

I have never before experienced such a wonderful mix of materials/media and techniques brought to bear on creating such combinations of colour, texture and 3-D forms which are both beautiful in themselves and intensely evocative of cosmic bodies, surfaces, nebulosities and events from fusion to impacts.

(Prof. J. Brown, 10th Astronomer Royal for Scotland)¹²

- ¹ A. Triaud, Professor of Exoplanetology, University of Birmingham. *Creativity and Curiosity Exhibition Text*. University of Birmingham (May 2022).
- ² J. Nasmyth and J. Carpenter, *The Moon: Considered as a Planet, a World and a Satellite*, New York 1885.
- ³ L. Fletcher, Professor of Planetary Science, University of Leicester. *Creativity and Curiosity Exhibition Text*. An Lanntair Arts Centre, Isle of Lewis, Outer Hebrides (January 2020).
- ⁴ N. Libeskind, Head of Cosmography and Large-Scale Structure, Leibniz Institut Fur Astrophysik, Potsdam, Germany. *Creativity and Curiosity Exhibition Text*. An Lanntair Arts Centre, Isle of Lewis, Outer Hebrides (January 2020).
- ⁵ T. Haworth, School of Physical and Chemical Sciences, Queen Mary College, University of London. *Creativity and Curiosity Exhibition Text*. An Lanntair Arts Centre, Isle of Lewis, Outer Hebrides (January 2020).
- ⁶ M. Fraser, Asst Professor of Astronomy, School of Physics, University College Dublin. *Creativity and Curiosity Exhibition Text*. An Lanntair Arts Centre, Isle of Lewis, Outer Hebrides (January 2020).
- ⁷ C. North, School of Physics and Astronomy, Cardiff University. *Creativity and Curiosity Exhibition Text*. Zeiss-Grossplanetarium, Berlin (October 2018).
- ⁸ A. Triaud, Professor of Exoplanetology, University of Birmingham. *Creativity and Curiosity Exhibition Text*. University of Birmingham (May 2022).
- ⁹ A. Triaud, Professor of Exoplanetology, University of Birmingham. *Creativity and Curiosity Exhibition Text*. An Lanntair Arts Centre, Isle of Lewis, Outer Hebrides (January 2020).
- ¹⁰ G. Finn, quoted by I. Biggs in online broadcast *Deep Mapping: A Partial View*, 2014, in S. Harrison, S. Pile, N. Thrift (eds), *Patterned Ground: Entanglements of Nature and Culture*, Chicago 2004.
- ¹¹ G. Finn, 'The Politics of Spirituality: The Spirituality of Politics', in P. Berry, A. Wernick (eds), *Shadow of Spirit*, London 1992.
- ¹² Prof. J. Brown OBE (1947-2019), 10th Astronomer Royal for Scotland. Private correspondence, 2019.