Northumbria University, Newcastle.
Art and Design: History, Practice and Theory. UoA 32.

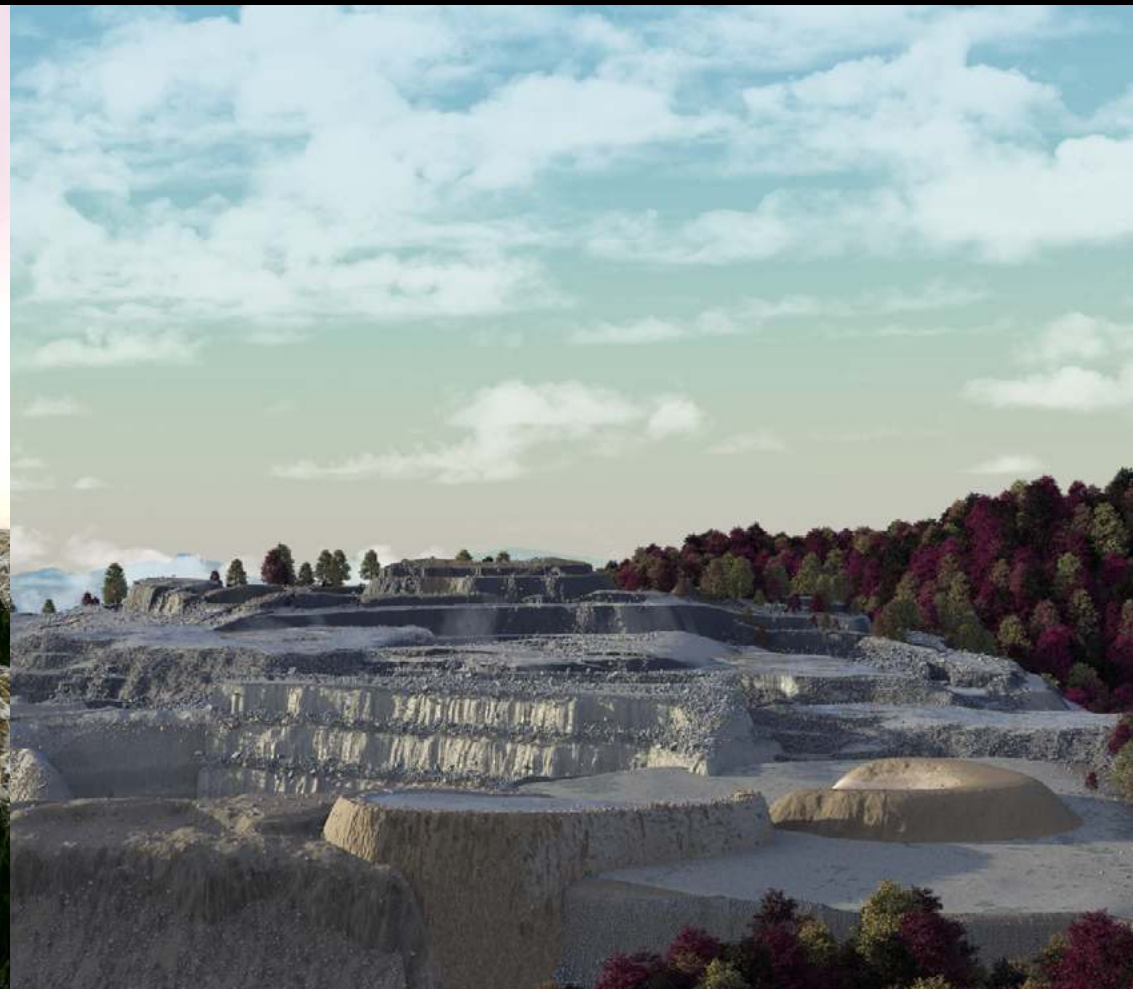Northumbria
University
NEWCASTLE

WIREFRAME VALLEY AND SPRUCE PINE, NORTH CAROLINA

Type of output: Exhibition (Computer-simulated video, exhibition)

by

Paul Dolan

Front cover image: *Wireframe Valley* (remade, 2017) & *Spruce Pine, North Carolina* (2018).

Left: Production still from *Spruce Pine, North Carolina* showing a seamless loop of simulated clouds.

CONTENTS

SUMMARY

Wireframe Valley (remade, 2017) and *Spruce Pine, North Carolina* (2018) form part of a body of practice-led research engaged with issues of media materiality (Fuller 2007; Cubitt, 2016; Parikka 2015), the environmental impact of media production (Grossman 2006; Maxwell & Miller 2012; Lepawsky 2018), computer simulation (Bogost 2007; Wardrip-Fruin 2012; DeLanda 2015) and the ontology of time (Adam 2004; Zielinksi 2008; Sharma 2014).

The works operate within new media art and contemporary art contexts, offering new knowledge to the fields of animation practice, new materialist philosophy, videogame studies and horology.

Wireframe Valley (remade, 2017) is a real time computer simulation of a natural environment that appears to materially degrade over days, weeks and months. It references the materiality and duration of computer simulations. The artwork was programmed to have a parametric duration that can algorithmically stretch to fit any time span. It was selected to be shown as part of a group show *Records and Wireframes* (2017) at NEoN Festival, Dundee Contemporary Arts Centre, Dundee.

This exhibition led to the commissioning of *Spruce Pine, North Carolina* (2018), an 8-minute CGI video artwork and two exhibitions. *Spruce Pine, North Carolina* developed the digital, speculative approach of *Wireframe Valley* into a more direct engagement with the physical locations of the media manufacturing industry. The artwork focuses on one specific location: Spruce Pine in North Carolina, a mine that provides Intel with raw silicon dioxide for use in the manufacturing of semi-conductors.

Research outcomes from both artworks yielded two conference papers and a book chapter. Conference paper *From Silicon to Pixel* (Dolan, 2019a) explored the relationship between geology and digital image production. It applied ideas from media materiality and media ecology studies to the production of computer simulated images and real time animation. This was written for an audience of animation scholars and practitioners.

A second conference paper (Dolan, 2019b) and book chapter *Recalcitrant Temporalities* (Dolan, 2020) developed an ontological framework for understanding the complex temporal behaviours at play in computer-simulated environments. This added to existing research in the study of assemblage theory by offering practical examples of how the theory can operate within artistic research. This paper and chapter were written for a broader contemporary art audience with an interest in time, simulation and assemblage theory.

Above: *Wireframe Valley* (remade, 2017) in situ at NEON Festival, Dundee Contemporary Arts, Dundee, 2017.
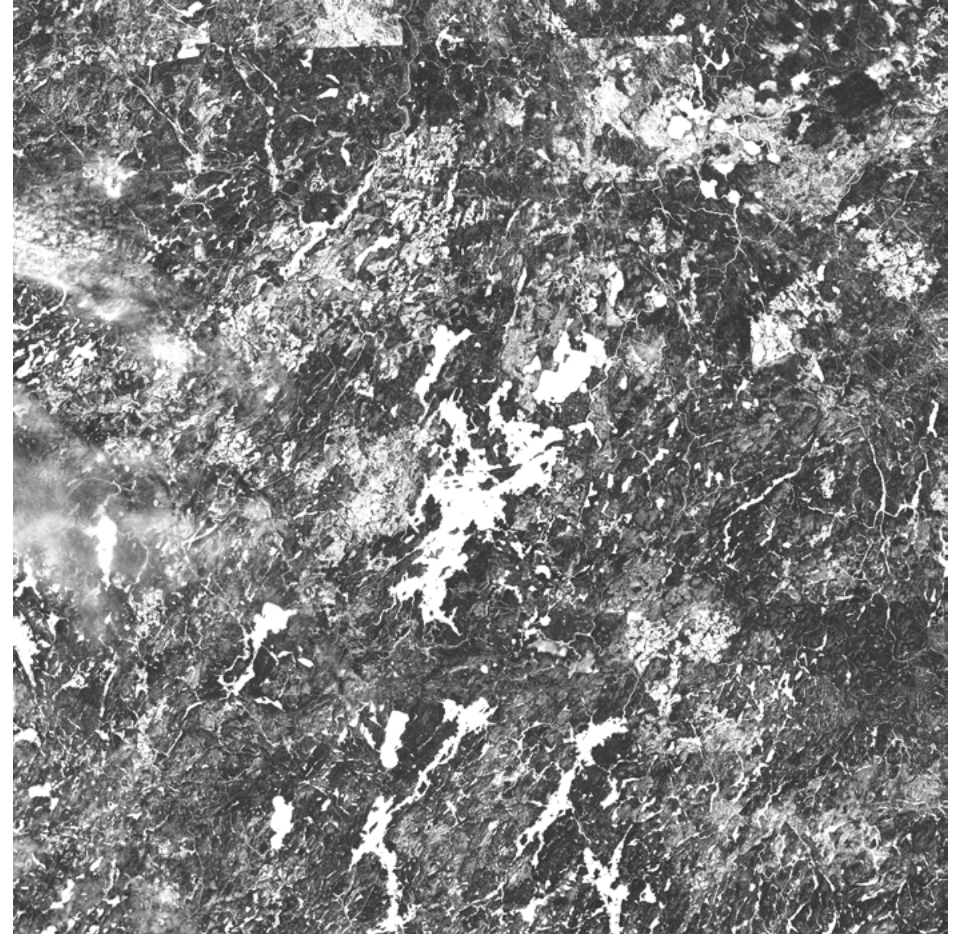
Right: Modified satellite data from the *Spruce Pine, North Carolina* (2018), *Photo credit: Paul Dolan*

RESEARCH CHALLENGE

There is a tendency for the material and labour conditions that underpin digital media to be understood in immaterial terms, beyond their material and geographical contexts. This dominant perspective hides the ecological and labour abuses involved in the functioning of the contemporary digital media landscape.

Media technologies and algorithms profoundly alter many aspects of our lives, yet their complexity and scale conceal their relationship with the real world. We focus on the usage of media devices at the cost of understanding the ecological impact of how they are manufactured and eventually disposed of.

This research works against this immaterial media rhetoric by exploring the physical locations that provide raw materials for use in the media manufacturing industry.

A practice-led approach was employed, in which contemporary art practice was used to generate research aims, test theories and generate new knowledge through the production of new art works and publications.

The research questions were:

- Which geographical locations do the physical materials of computer simulations originate from?

- How can an increased awareness of the origins of media materials impact our understanding of digital culture?

- How do geologic and digital temporalities relate to each other?

" …Spruce Pine, North Carolina (2018) challenges the immaterial idea of the digital work and its technology. By inviting the viewer to contemplate the material origins of the technology around them, Dolan provides an insight to the changing landscape of our ecology.

Spruce Pine, North Carolina (2018) also calls on the concept of the Anthropocene (the proposed epoch for human impact on the earth) that provides a valuable context for the work; the aesthetic of the human made vista."

Ball, A., 2018, http://www.art-gene.co.uk/news/digital-u-paul-dolan/

Below: Production still, 2018,
Paul Dolan. Drone footage (left) is used
to align the separate pieces of simulated
terrain in *Houdini* software.
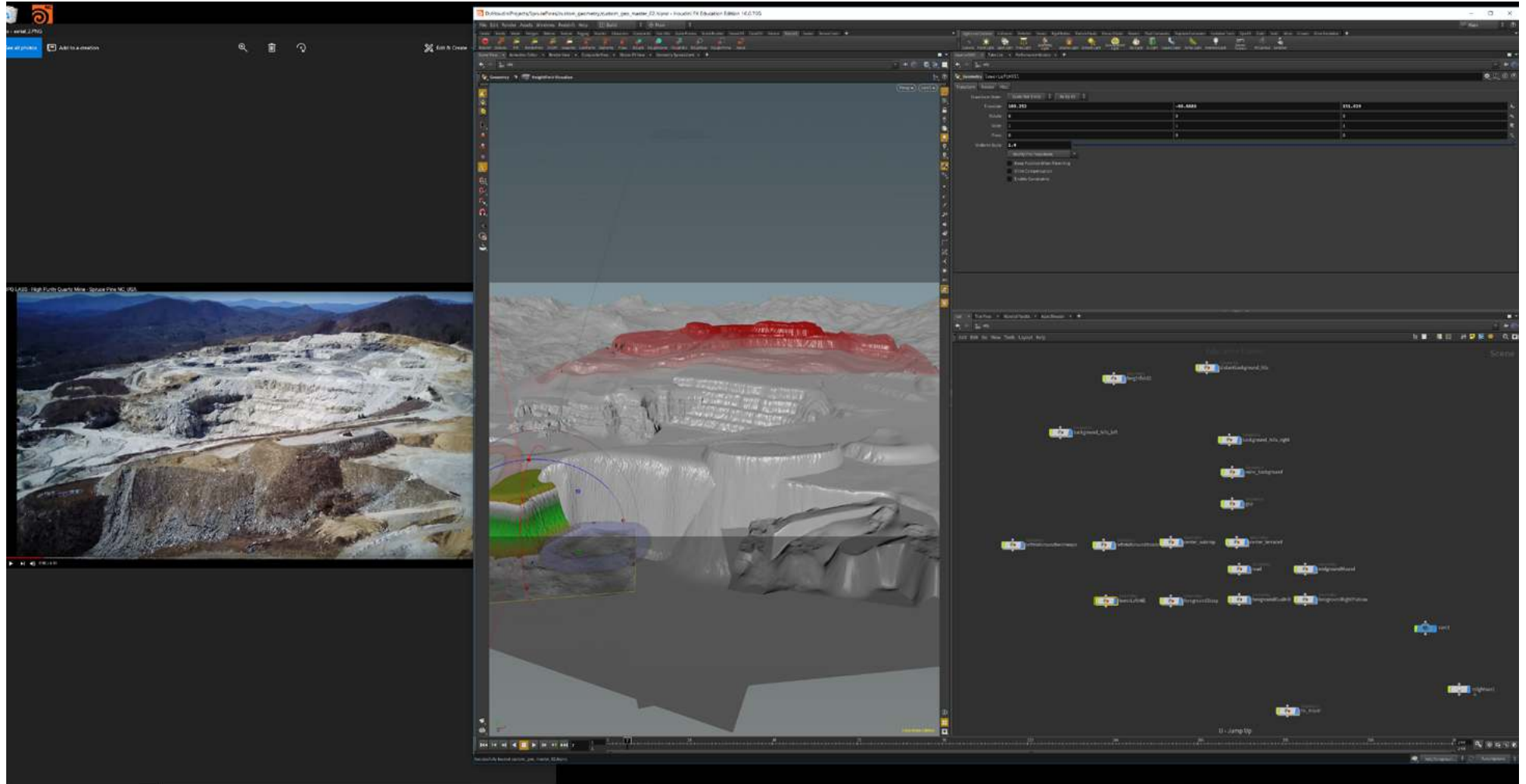
CONTEXT

Wireframe Valley (remade, 2017) was originally commissioned by Dominic Smith for a group exhibition entitled *Land Engines* at Queens Hall, Hexham in 2014. As a result of this exhibition, artist Kelly Richardson selected the work to be shown alongside Canadian video artist Paul Walde's work *Requiem for a Glacier* (2013) as part of NEoN Festival 2017. It was necessary to remake the work to change its duration from three months to fourteen days.

This exhibition led to *Spruce Pine, North Carolina* (2018) being commissioned by Alejandro Ball on behalf of Art Gene, an organisation from Cumbria, UK. It was originally exhibited online between September and January 2018-19 via the Art Gene website and was selected for exhibition at the 31st Society for Animation Studies conference at the Convento de São Pedro de Alcântara, Lisbon, Portugal 17-21st June 2019.

The critical use of commercial software tools to simulate an environment places this work alongside the practice of artists such as John Gerrard and Kelly Richardson who simulate real and speculative locations often with an ecological focus. *Spruce Pine, North Carolina* (2018) adds to these practices by more directly linking the environment with the materials of the computer used to create and display the work. The written outputs also develop a philosophical framework for understanding how time functions within similar computer simulated artworks.

Above: Dundee Contemporary Arts, Dundee.

The conference paper (Dolan, 2019b) and book chapter (Dolan, 2020) offer new knowledge for the fields of animation practice, new materialist philosophy, videogame studies and horology, through the development of an ontological framework for understanding real time.

The philosophical context relates to Deleuze and Guattari's notion of the assemblage (Deleuze & Guattari, 2013), a set of ontological ideas that can be used to understand objects and processes as relational, networked, multi-agential actors within a flat ontology. The written research outputs in this portfolio offer a contemporary engagement with these ideas by building on DeLanda's augmentation of assemblage theory with ideas and terminology from contemporary computer science (DeLanda, 2016).

Computer science has changed dramatically since *A Thousand Plateaus* was first published in 1980. Although Deleuze and Guattari were initially critical of the hierarchical and centralized structure of computer languages and processes, contemporary programming languages now possess remarkable similarities with the structural principles of assemblage theory. The framework of *Recalcitrant Temporalities* (Dolan, 2020) produced as part of this research exemplifies how these philosophical and computational affinities operate in relation to computer simulated time.
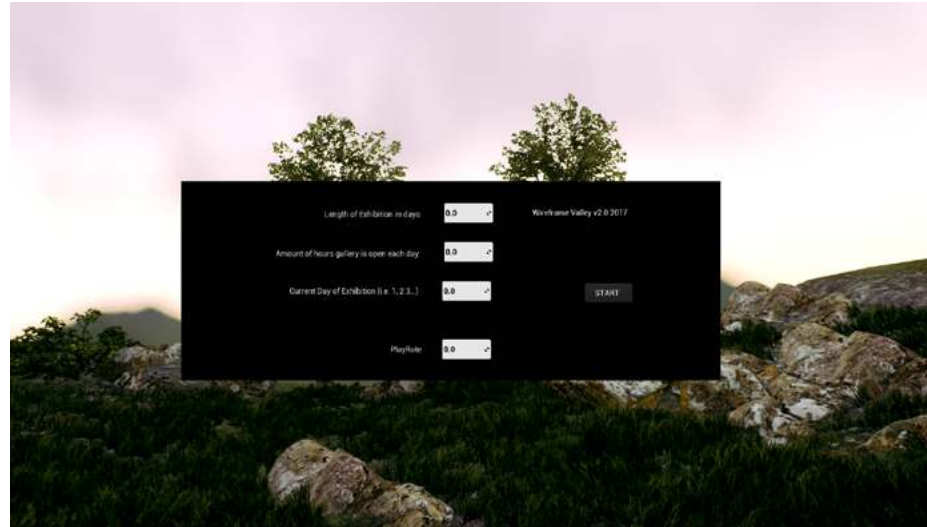

Above: Art-Gene, Cumbria, courtesy of Art-gene.co.uk
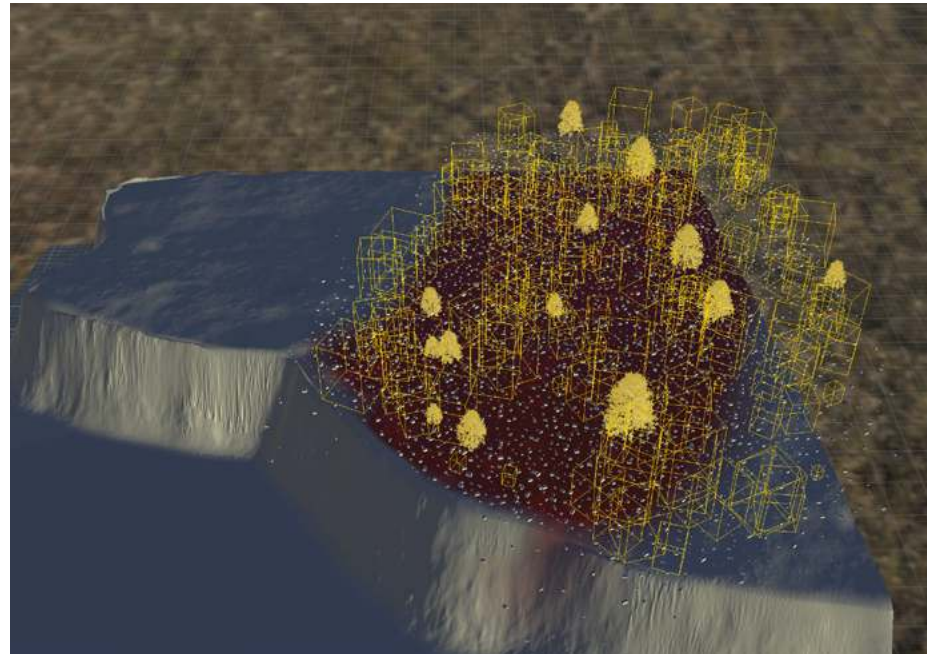
METHODS AND PROCESSES

A practice-led methodology was used in which the production of artworks initiated a research context. The following processes occurred as part of this methodology:

- Literature review of media materiality (Fuller 2007; Cubitt 2016), computer simulation (Bogost 2007; Wardrip-Fruin 2012, DeLanda 2015) and time (Adam 2004; Zielinksi 2008; Sharma 2014).
- *Wireframe Valley* (remade, 2017) was constructed with a variety of software tools. Aspects of action research and reflective practice underpinned the trajectory of the research, with multiple cycles of making, reading and reflection over a 6 month period.
- During the remaking of *Wireframe Valley* (remade, 2017) a new method for programming time was created, in which the duration of the artwork can be easily configured to elapse over any duration.
- Reflection on the making of *Wireframe Valley* (remade, 2017) led to a criticism of the prevailing notion of 'real time' and a desire to shift the research practice from a speculative digital space to locations in the real world.
- A review of media waste and materiality literature, such as (Grossman 2006; Maxwell & Miller 2012; Cubitt 2016; Lepawsky 2018), led to the identification of silicon as a key material of semi-conductors.

- Further online research and engagement with mining discussion groups led to the identification of *Spruce Pine, North Carolina* and a nearby resident Tony Lee Glenn.
- An online collaboration with Tony Lee Glenn led to the production of the audio recording, and access to his drone footage archive of the site.
- Satellite imagery was obtained via the U.S Geological Survey site and Google Maps. A combination of both image sources was used to model and simulate the terrain using *Houdini* visual effects software.
- Vegetation, trees and rocks were modelled, animated and scattered on the terrain in the software using algorithmic processes.
- Clouds were simulated in *Terragen* software and composited into the work.
- The work was edited with the sound in video editing software.
- Notes, diary entries and a continued engagement with literature led to the first conference paper 'From Silicon to Pixel' (Dolan, 2019a) which helped clarify the context of the artwork.
- Further reflection and a continued artistic interest in the temporal function of computer simulations led to a second conference paper and the book chapter, both entitled *Recalcitrant Temporalities: Heterogenous Time and the Simulated Image* (Dolan, 2019b).
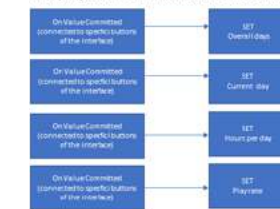
Right: Interface screen for *Wireframe Valley* (remade, 2017), showing the parameters that can be used to change the duration of the artwork.


Set variables for days, current day, hours of exhibition time per day and play rate when numbers entered into interface.
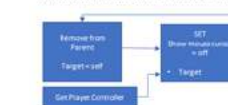

When Start button is pressed on the interface, sets start and end frame of the sequence. Animated key frames are automatically stretched across this duration.

Right: Production still showing a scattering of trees in *Houdini* software.
Photo credit: Paul Dolan
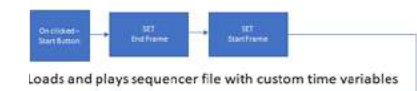
Loads and plays sequencer file with custom time variables
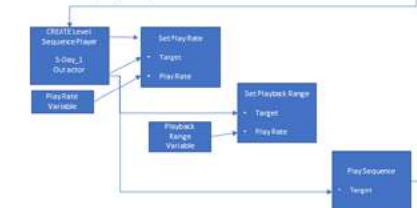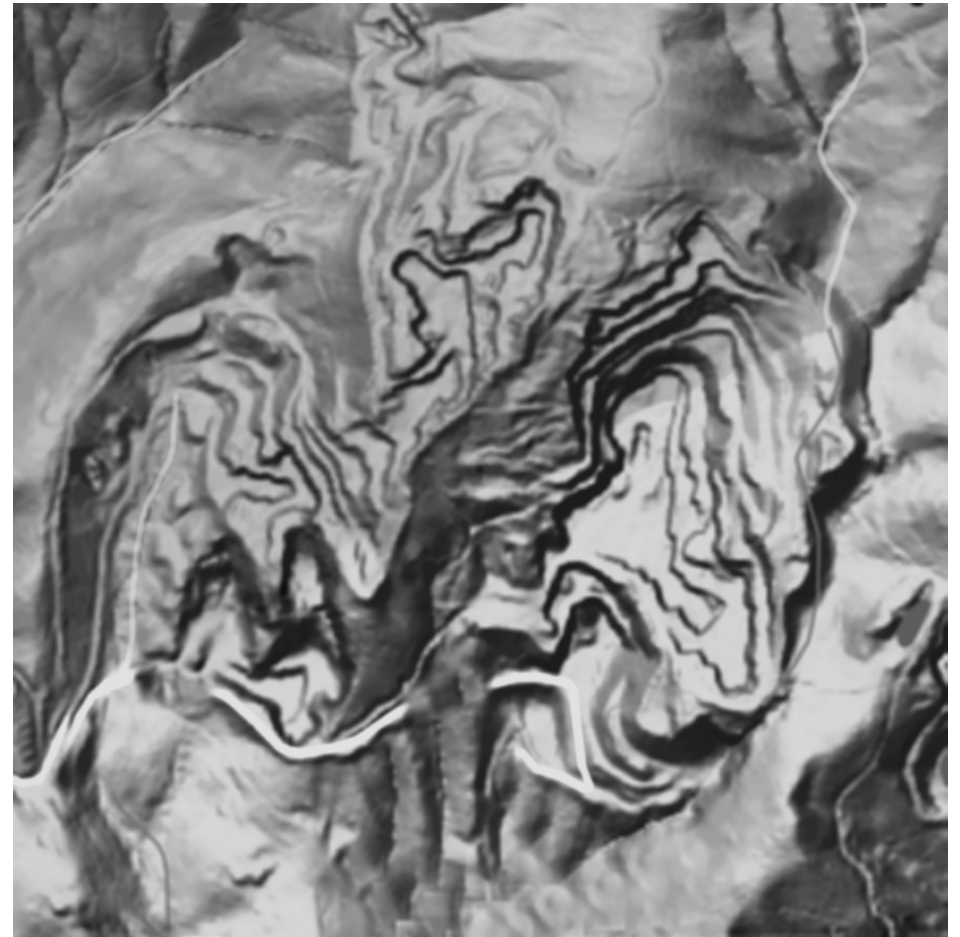

Removes menu and mouse cursor from screen

Above: Flow chart showing the algorithmic organisation of the parametric time system.

Above: Composite of Google Photo maps of Spruce Pine used to digitally model the terrain.
Photo credit: Paul Dolan

Above: Satellite data of the area, Google Maps.

DISSEMINATION

The research elements of this project were:

- The production of two new computer-simulated artworks;
- Three exhibitions;
- One public talk;
- Two conference papers;
- One book chapter.

Wireframe Valley (remade, 2017) reached hundreds of people as part of the exhibition at Dundee Contemporary Arts between 17th - 30th November 2017. A public talk organised as part of the festival had 300 members of the public in the audience and according to the online figures, over 1000 watching online. The event is archived on the NEoN website here.

Spruce Pine, North Carolina (2018) reached hundreds of viewers via its online exhibition and hundreds more to the 300+ attendees at the Lisbon exhibition. It continues to be streamed via my personal website at www.paulmichaeldolan.com.

Research outcomes from both artworks were disseminated to an international academic community on 20th June 2019 at the 31st Society for Animation Studies conference in Lisbon, through a paper entitled 'From Silicon to Pixel: Exploring the material origins of the simulated image'. This conference panel included leading academics of experimental and expanded animation practice including Miriam Harris, Fransiska Bruckner and in the audience, Lilly Husbands, Aylish Wood and Birgitta Hosea.

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A second conference paper entitled 'Recalcitrant Temporalities: Real time animation as multi-domain assemblages' (Dolan, P., 2019) was presented on 10th December 2019 at the 3rd International Conference on Deleuze and Artistic Research, Orpheus Institute, Ghent. This paper was selected by the conference organisers to be developed and included in a book entitled *Machinic Assemblages of Desire* (Assis and Guidici, 2020). The book contains chapters from world leaders in post-Deleuzian studies such as Yuk Hui, Ian Buchanan and Thomas Nail.

Link to Wireframe Valley:
https://vimeo.com/473573441
Password: *REFPORTFOLIO*

Link to *Spruce Pine, North Carolina* (2018):
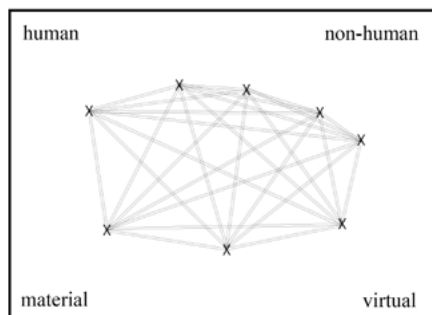https://www.youtube.com/watch?v=QEOrUyLg5xE

Image: Paul Dolan presenting about *Wireframe Valley* at a public Pecha Kucha event, NEoN Festival, 2017, Dundee.

Below: The Pecha Kucha audience from
NEoN Festival 2017, Dundee.

Above: Dolan, P., 2018. Materialist Simulation Framework. Diagram shows how simulated images are entangled across four domains.
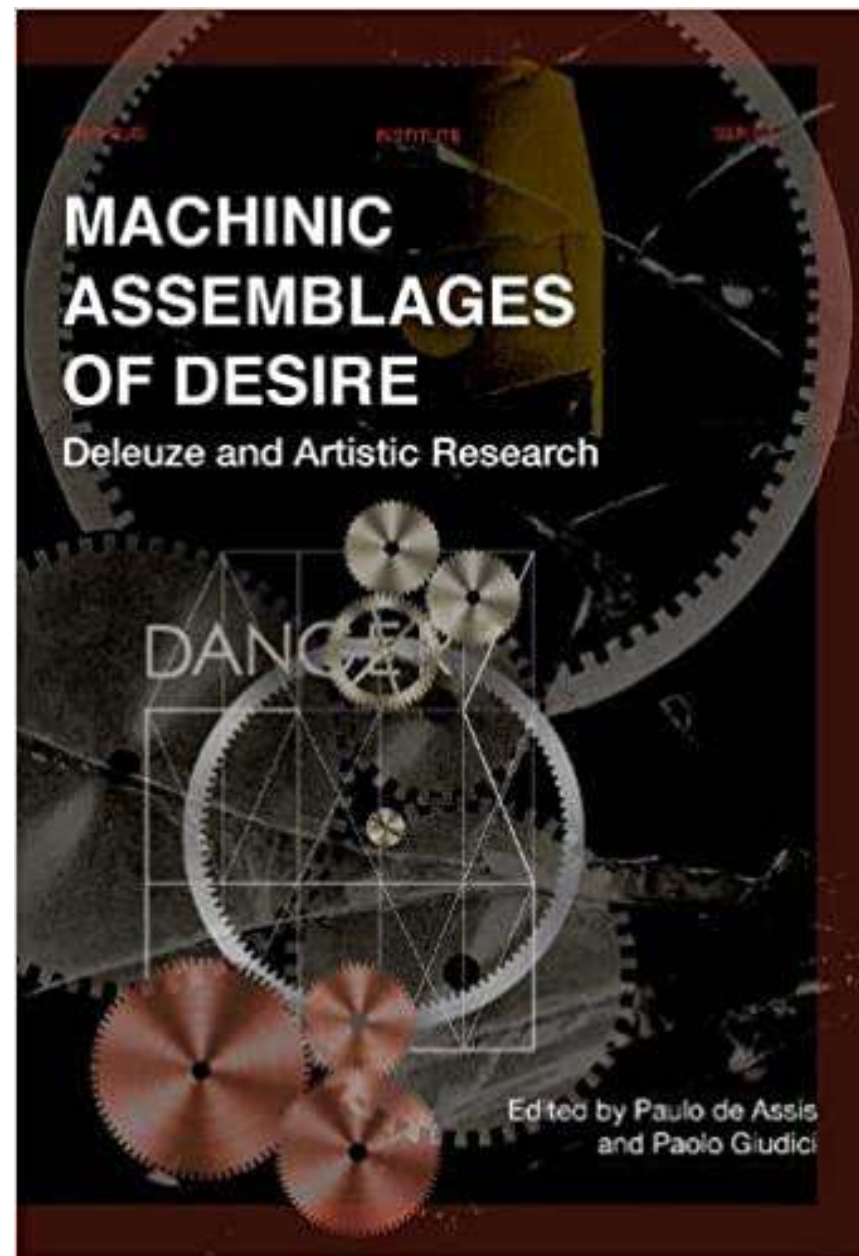

Above: Presenting 'From Silicon to Pixel: Exploring the material origins of the simulated image' conference paper at the 31st Society for Animation Studies conference in Lisbon, June 2019.
Photo credit: Ellie Land

Right: *Machinic Assemblages of Desire* book cover.
Photo credit: Orpheus Institute

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APPENDICES

Appendix 1:
http://paulmichaeldolan.com/spruce-pine-north-carolina-2018-1

Appendix 2:
http://sas2019.ulusofona.pt/presentations/from-silicon-to-pixel-exploring-the-material-origins-of-the-simulated-image/

Appendix 3:
http://www.art-gene.co.uk/digital/paul-dolan-spruce-pine-north-carolina/

Appendix 4:
https://www.amazon.co.uk/Machinic-Assemblages-Desire-Artistic-Institute/dp/9462702543

ACKNOWLEDGEMENTS

Back cover image: Production still from *Spruce Pine, North Carolina* showing a seamless loop of simulated clouds.

Above: Still from Drone reference footage.
Photo credit: Tony Lee Glenn