

Experiences with Educating AI at the Media Technology MSc Program

— Maarten H. Lamers

DS&AI 2022 — Education Session — Oct 4 2022



**Universiteit
Leiden**
The Netherlands

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A little about me

Computer scientist

neural networks

MSc (Utrecht University, 1993); PhD (Leiden University, 2001)

Assistant professor (Leiden University)

Game developer

Co-founder of global brand of lasertag products

Technical game producer for international TV game shows

Nerd

Voted among “*101 Most Interesting Nerds*” of the Netherlands by a major national magazine

Maarten Lamers / Neural Networks for Analysis of Data in Environmental Epidemiology / A Case-study into Acute Effects of Air Pollution Episodes





Media Technology MSc Program

Are you eager to bring your own questions and curiosity into scientific research? Do the creation of media and use of technology drive your research interests? Could you be a researcher who challenges scientific practice and pushes its boundaries?

Research informed by a creative and critical mindset

The Media Technology MSc programme offers an interdisciplinary and international environment for students to produce scientific work informed by a creative and critical mindset. We welcome applicants from diverse educational backgrounds with a shared fascination for research and technology. Besides engaging in our core courses, students draw from the knowledge throughout Leiden University and other institutes. After graduation alumni pursue a career as life-long researchers within science, (creative) industries, or education.

Discover more



31 August 2021
Meet our alumni

Getting a Master's degree in
Leiden

Masters information activities



Royal
Academy of Art
The Hague



Royal
Conservatoire
The Hague



Research intense

→ PhD students

Autonomous researchers

Maker's attitude

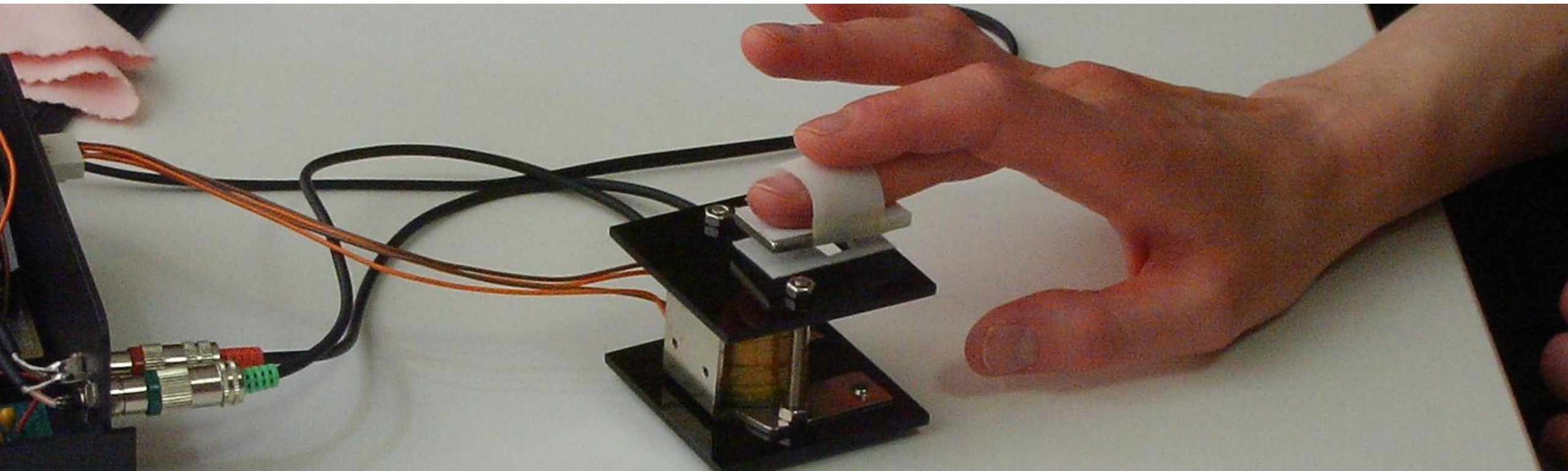
→ New research direction and unconventional hypotheses

Students as researchers

Only student project ideas

Thesis as article

→ Student publications



Some facts

- ⇒ Since 2001
 - ⇒ 2-year program (4 semesters)
 - ⇒ English
 - ⇒ Master-of-Science (MSc) degree
- ⇒ 30-50% internationals
 - ⇒ ± 50% female, 50% male students
 - ⇒ 25 – 35 students per year (*no maximum*)
- ⇒ Not a core Computer Science program
 - ⇒ No specific BA/BSc required!
 - ⇒ Incoming: CS, psych, design, engineering, arts, sciences, ...



AI in the Media Technology MSc Program

A blurred background image of a lecture hall with several students sitting at desks, looking towards the front. The focus is on a young woman with long brown hair in the foreground, who is looking slightly to the right. Other students are visible behind her, some looking at laptops or towards the front of the room.

Within the curriculum

Seminar course: Artificial Intelligence

Broad context of AI

Why do we need AI?

History

Philosophy of mind

Basic techniques (NNs, EAs, swarm comp)

Alternatives (e.g. bio-digital hybrid systems)

Course: Computational Creativity

Sub-field of AI

What is machine-creativity?

Computational models of creativity

Creative (multi-)agent models

How to evaluate machine creativity

Hands-on constructing a creative system

Both courses have strong focus on context of AI and research

Elective AI courses

Intended for personal deepening

AI technology

Natural Computing

Modern Game AI Algorithms

Automated Machine Learning

Evolutionary Algorithms

Deep-Learning and Neural Networks

...

A specific context for AI

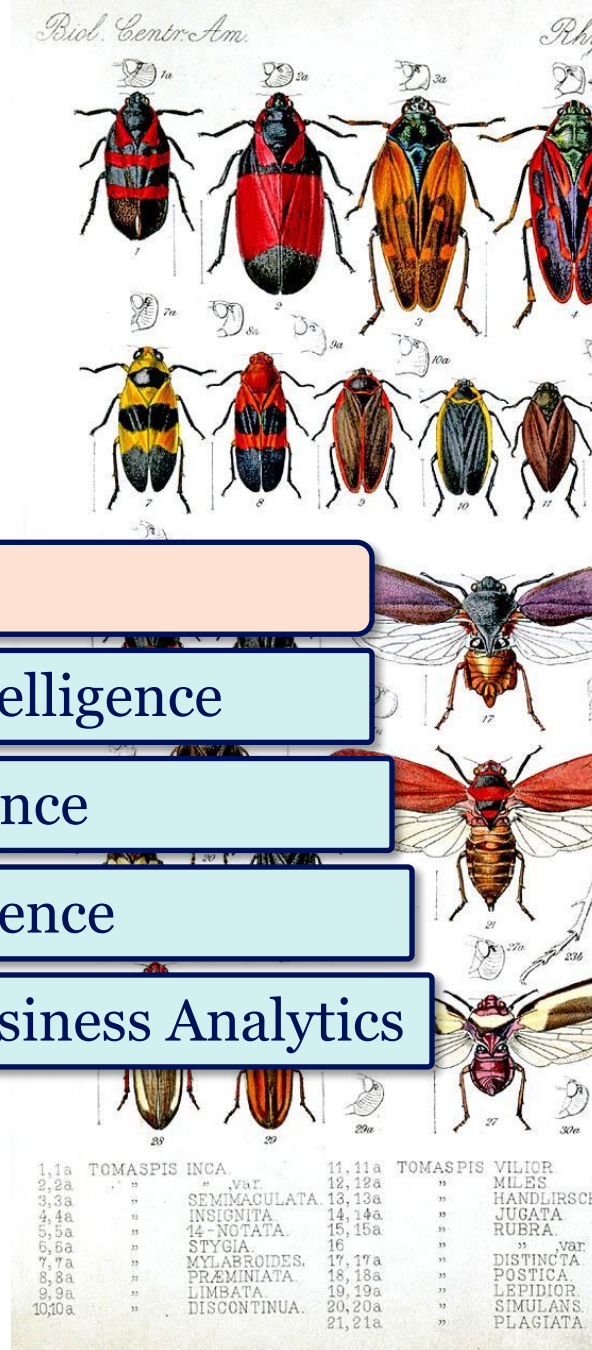
Governance of Artificial Intelligence

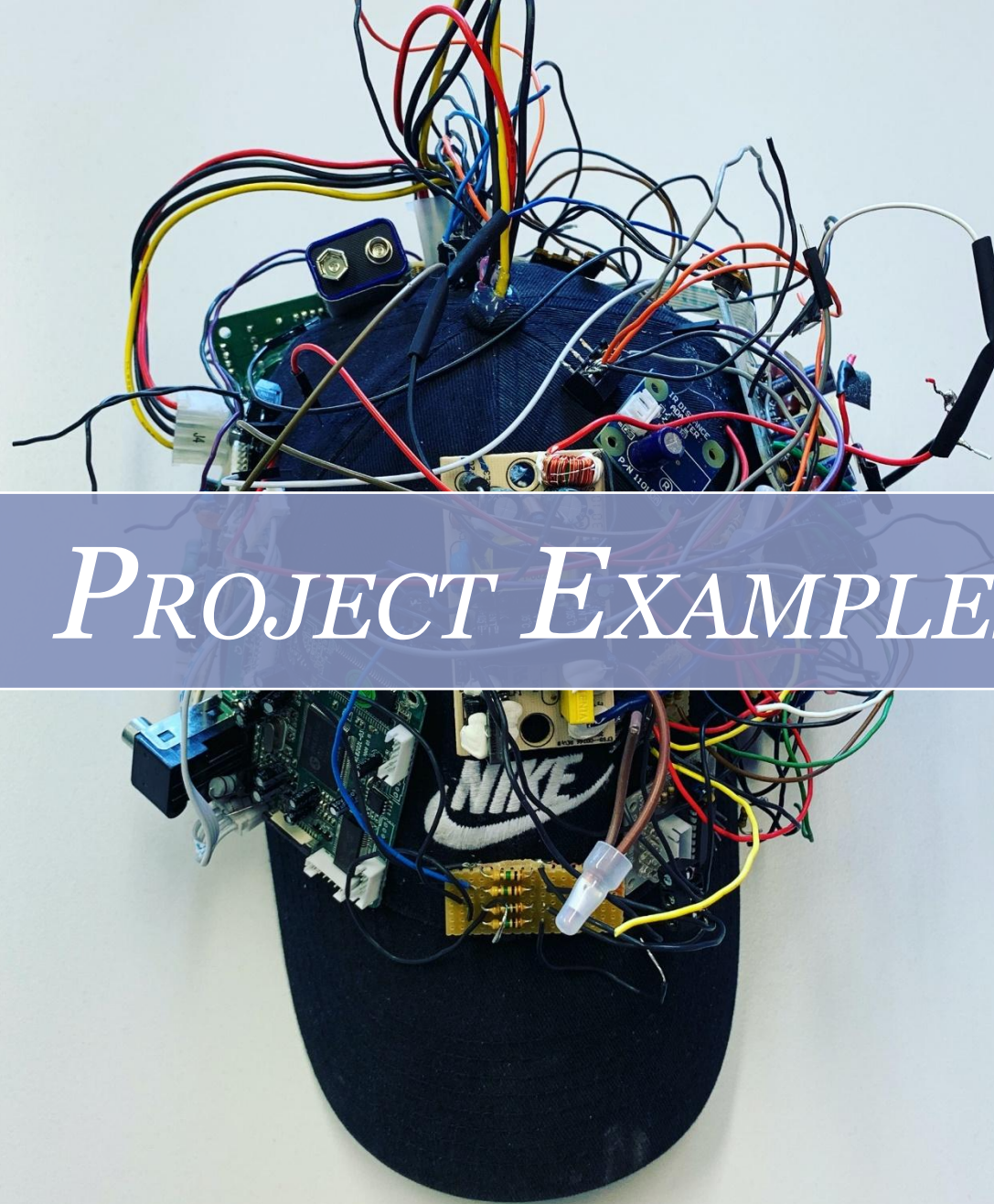
Law and Artificial Intelligence

Ethics of Artificial Intelligence

Machine Learning for Business Analytics

...





PROJECT EXAMPLES



Trust Me on This One: Conforming to Conversational Assistants

Donna Schreuter¹  · Peter van der Putten¹ · Maarten H. Lamers¹

Received: 31 December 2020 / Accepted: 6 November 2021
© Springer Nature B.V. 2021

Abstract

Conversational artificial agents and artificially intelligent (AI) voice assistants are becoming increasingly popular. Digital virtual assistants such as Siri, or conversational devices such as Amazon Echo or Google Home are permeating everyday life, and are designed to be more and more humanlike in their speech. This study investigates the effect this can have on one's conformity with an AI assistant. In the 1950s, Solomon Asch's already demonstrated the power and danger of conformity amongst people. In these classical experiments test persons were asked to answer relatively simple questions, whilst others pretending to be participants tried to convince the test person to give wrong answers. These studies were later replicated with embodied robots, but these physical robots are still rare. In light of our increasing reliance on AI assistants, this study investigates to what extent an individual will conform to a disembodied virtual assistant. We also investigate if there is a difference between a group that interacts with an assistant that communicates through text, one that has

Do people conform to advice of voice assistants, even though they suspect that it is wrong advice?

Student's idea

Original question

Digital extension of Asch's famous experiment

Non-applied work, pure research

Contextual to AI

Published in a highly relevant journal

Computational Plot Planning: A Temporal Social Network Approach

Haoran Ding

Media Technology MSc Programme, Leiden University

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Thesis supervisors:

Frank Takes, Leiden University

Pádraig Mac Carron, University of Oxford

Maarten Lamers, Leiden University

Abstract

Computational plot planning is an important topic and challenge in the field of artificial intelligence and computational creativity. Current methods dealing with the problem of story plot planning face difficulties in supporting long storylines and complex social structures. To solve this, we propose a new approach: using a temporal social network as a reference to plan future social interactions among characters in the developing plot. In this study, we analyze the development of social networks in stories through time and make predictions on future social network structures. Furthermore, we address three special properties of story social networks that each bring unique problems with them: newly introduced characters at each chapter, characters leaving the story, and special narrative focus. We used a LSTM recurrent neural networks model to analyze four story datasets: the Odyssey, Iliad, Lord of the Rings and Game of Thrones. Based on this, our model attempts to predict a social network structure that fits the structure of the existing story. The model successfully predicted story social network structures that were similar to those in the original stories and shows promising potential for the plot planning field.

Keywords: Plot planning, social network analysis, temporal networks, recurrent neural networks.

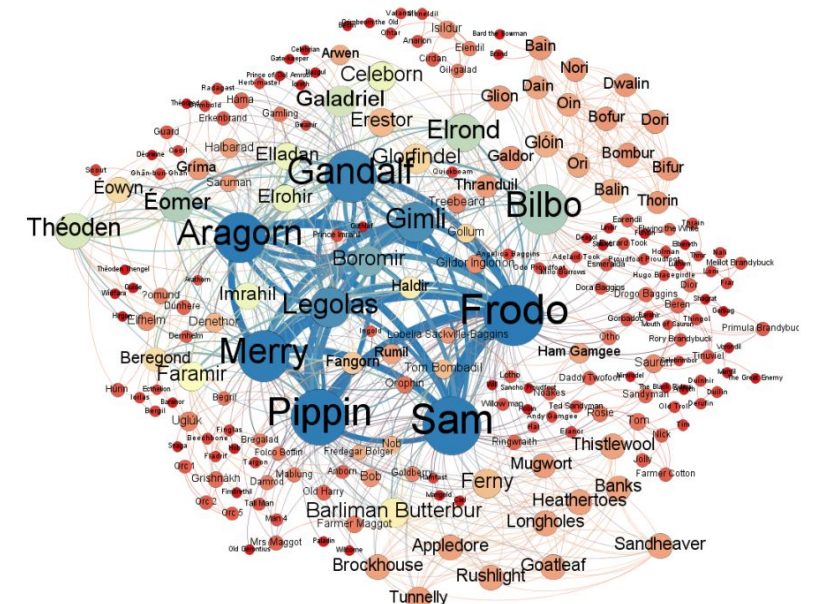
Using an LSTM recurrent neural network to predict social network development over time, in stories such as *Lord of the Rings* and *Game of Thrones*.

Student's idea

Playful

Technology-driven

Relevant



Bonding with a Couchsurfing Robot: The Impact of Common Locus on Human-Robot Bonding In-the-wild

JOOST MOLLEN*, Delft University of Technology, The Netherlands

PETER VAN DER PUTTEN, Media Technology, Leiden University, The Netherlands

KATE DARLING, MIT Media Lab, USA

Due to an increased presence of robots in human-inhabited environments, we observe a growing body of examples in which humans show behavior that is indicative of strong social engagement towards robots that do not possess any life-like realism in appearance or behavior. In response, we focus on the under-explored concept of a common locus as a relevant driver for a robot passing a social threshold. The key principle of common locus is that sharing place and time with a robotic artifact functions as an important catalyst for a perception of shared experiences, which in turn leads to bonding. We present BlockBots, minimal cube-shaped robotic artifacts that are deployed in an unsupervised, open-ended and in-the-field experimental setting aimed to explore the relevance of this concept. Participants host the BlockBot in their domestic environment before passing it on, without necessarily knowing they are taking part in an experiment. Qualitative data suggest that participants make identity and mind attributions to the BlockBot. People that actively maintain a common locus with BlockBot by taking it with them when changing location, on trips and during outdoor activities, project more of these attributes than others.

CCS Concepts: • **Human-centered computing** → *Empirical studies in HCI*; *Field studies*; *Empirical studies in interaction design*; *Empirical studies in interaction design*; **Empirical studies in HCI**; • **Computer systems organization** → *Robotics*; • **Applied computing** → *Psychology*.

Additional Key Words and Phrases: human-robot interaction, human-robot relationships, bonding, in-the-wild study, qualitative study, common locus, abstract robots

1 INTRODUCTION

Robots are entering human-inhabited environments in growing numbers. However, we lack robust theories on how people make sense of these new robotic co-inhabitants and collaborators [84, 89]. Jung and Hinds note that research on human-robot interaction has been 'dominated by laboratory studies, largely examining a single human interacting with a single robot' - causing a disconnect between these studies and the socially complex environments robots are aimed to be - and exceedingly are - placed in [47]. Several authors have therefore argued to supplement controlled laboratory research with field studies on human-robot interaction in the real world [7, 84, 91].

Recently, several such studies have been conducted to increase our understanding of human-robot interactions 'in the wild', for example in care homes [32], school classrooms [2] and in homes with children [69] and the elderly [41]. The humanoid robot Kaspar spent over a year in a special nursery for autistic children [91]. Furthermore, robot field studies have studied how humans in public space react to robots that approach them [107], listen to them [74], greet them in hotel lobbies [73] or give tours in museums [46].

*Research performed while at Media Technology, Leiden Institute for Advanced Computer Science, Leiden University

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2573-9522/2022/9-ART

<https://doi.org/10.1145/3563702>

ACM Trans. Hum.-Robot Interact.

Does sharing place and time with a non-lifelike robotic artifact lead to bonding experiences?



Student's idea

Relevant question

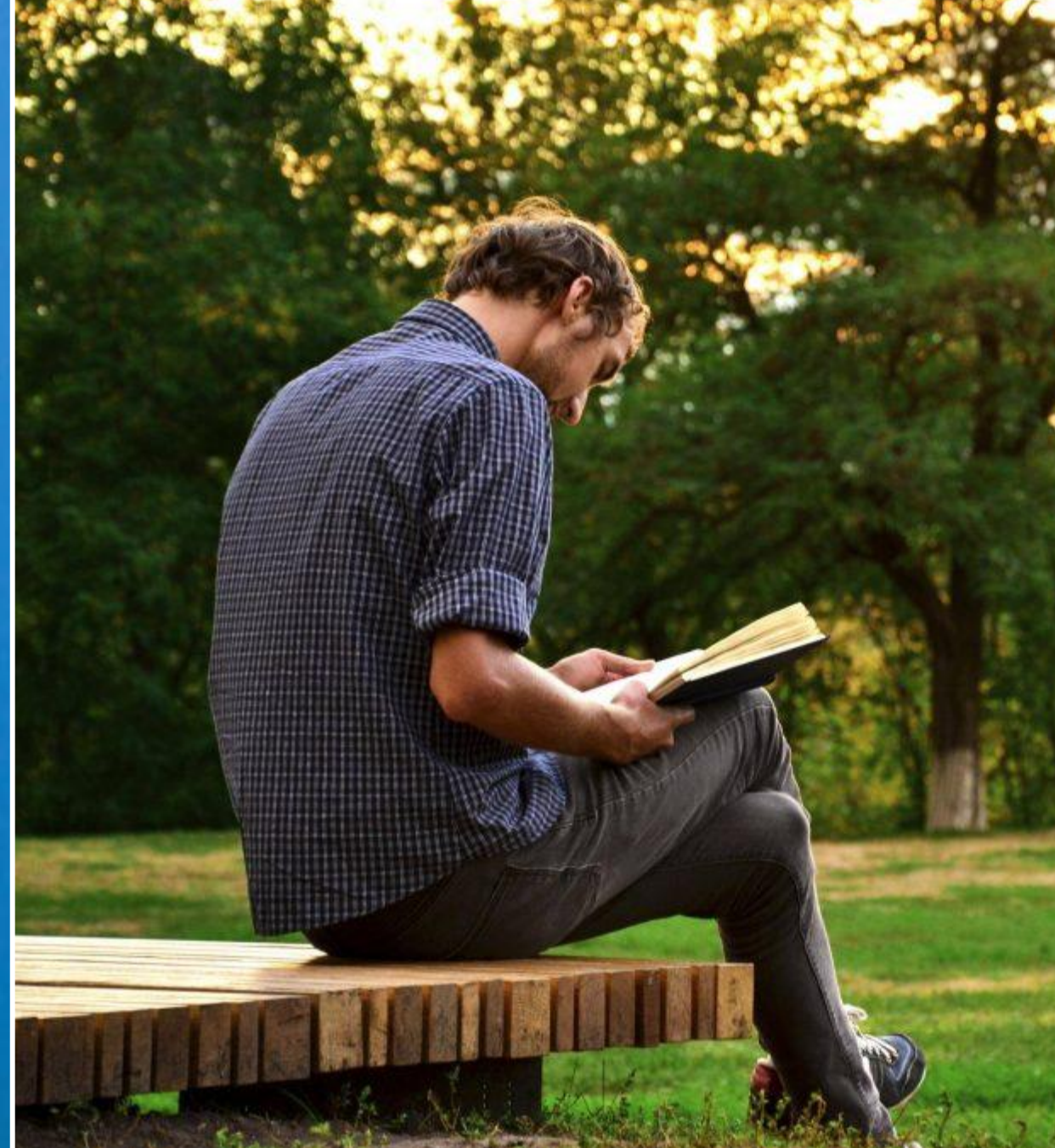
Playful, unconventional method

About the human context of AI

Published in a highly relevant journal



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Context-dependent memory effects (Godden & Baddeley, 1975)

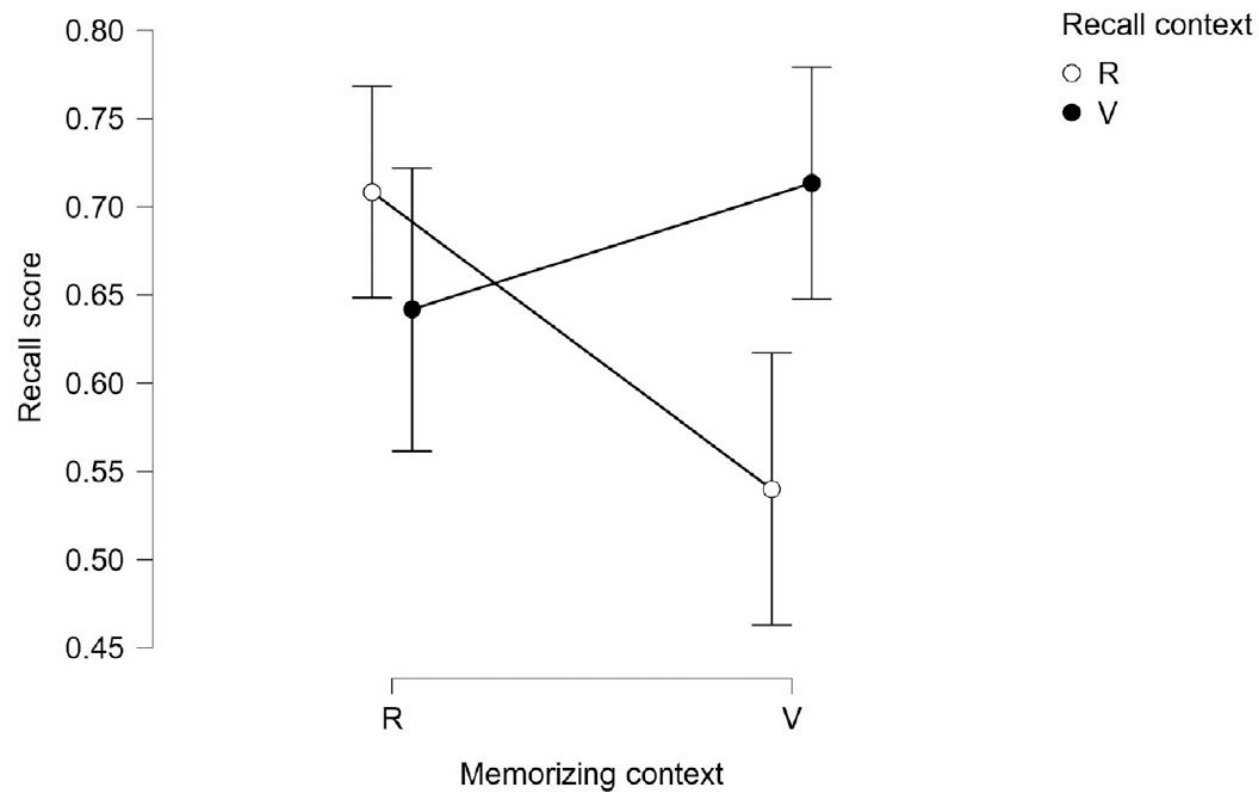
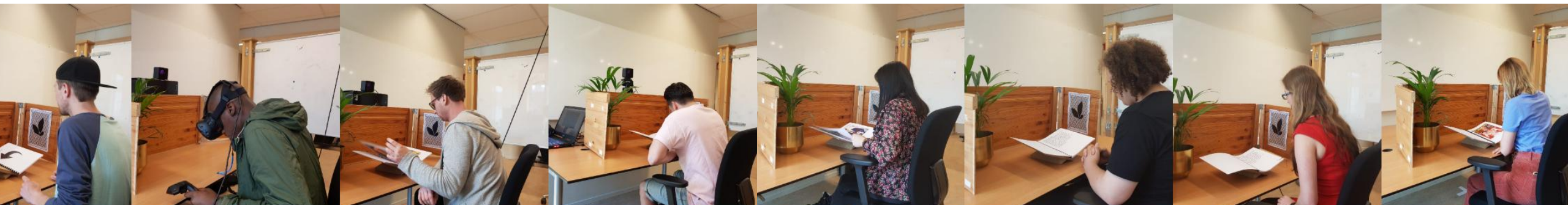


FIGURE 5 | Plot of mean recall scores with 95% confidence intervals for four different combinations of memorizing and recall contexts. Crossing of the connecting lines illustrates potential interaction of the memorizing and recall contexts on the recall score (detailed values in **Table 4**).





Changing Between Virtual Reality and Real-World Adversely Affects Memory Recall Accuracy

Maarten H. Lamers and Maik Lanen*

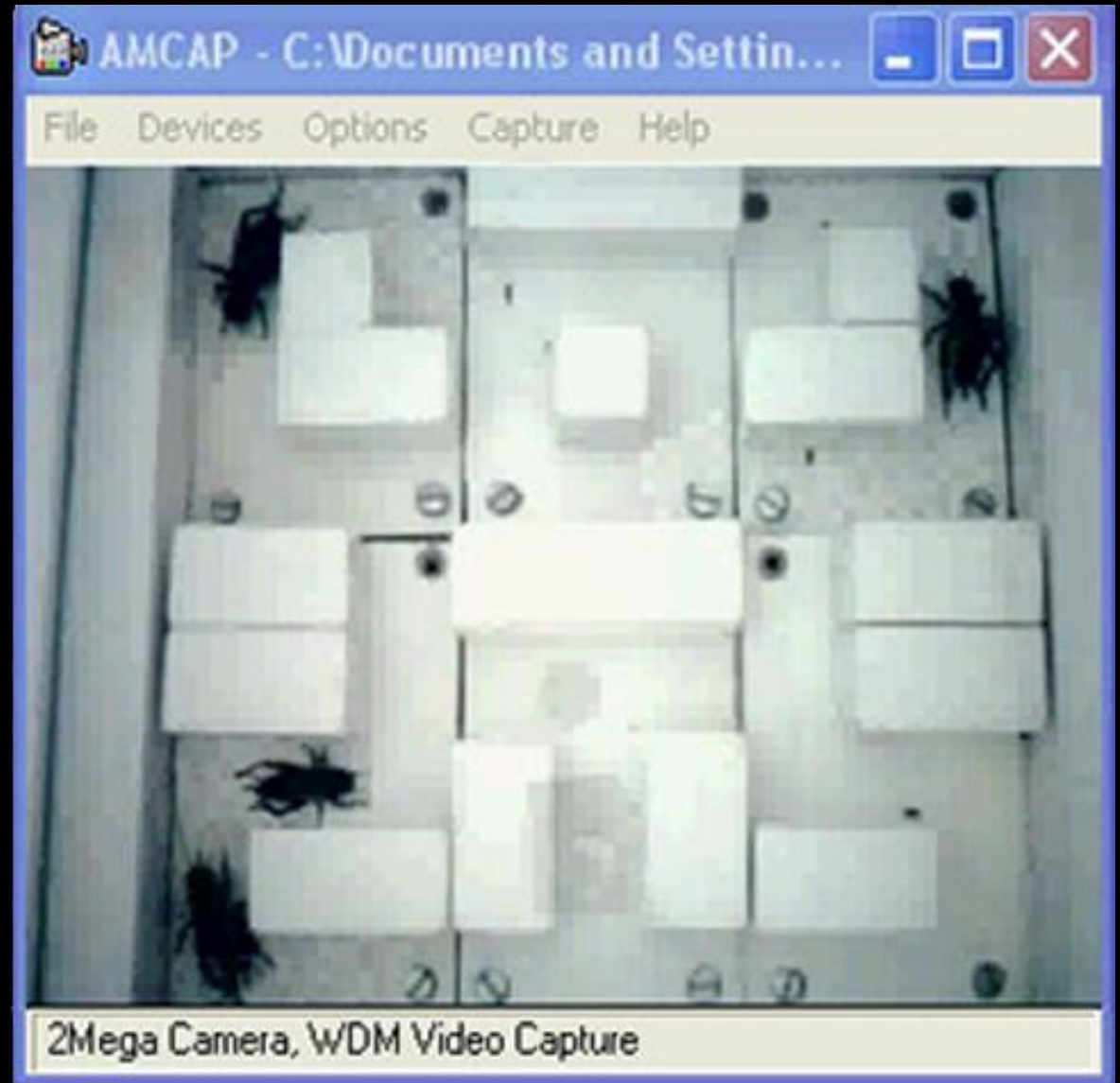
Leiden Institute of Advanced Computer Science, Leiden University, Leiden, Netherlands

Context-dependency effects on memory exist, whereby people's context influences their ability to accurately recall items from memory. This effect was not previously studied when considering virtual reality as an environmental context. We show that adverse effects on recall of memorized items exist when changing between virtual and real environments. The effect was not present when memorizing and recall were both done in VR; it appears to be caused by the change of environmental context. This previously unknown effect may

A photograph showing various microbial colonies growing on a dark, textured surface. In the upper left, there is a large, intricate, orange-brown branching colony. To its right and below are several smaller, more diffuse colonies in shades of grey, blue, and green. The background is dark and appears to be a natural rock or soil surface.

Microbial Content Generation for Natural Terrains in Computer Games





growth base

microorganisms

non-sterile black agar

Petri dishes



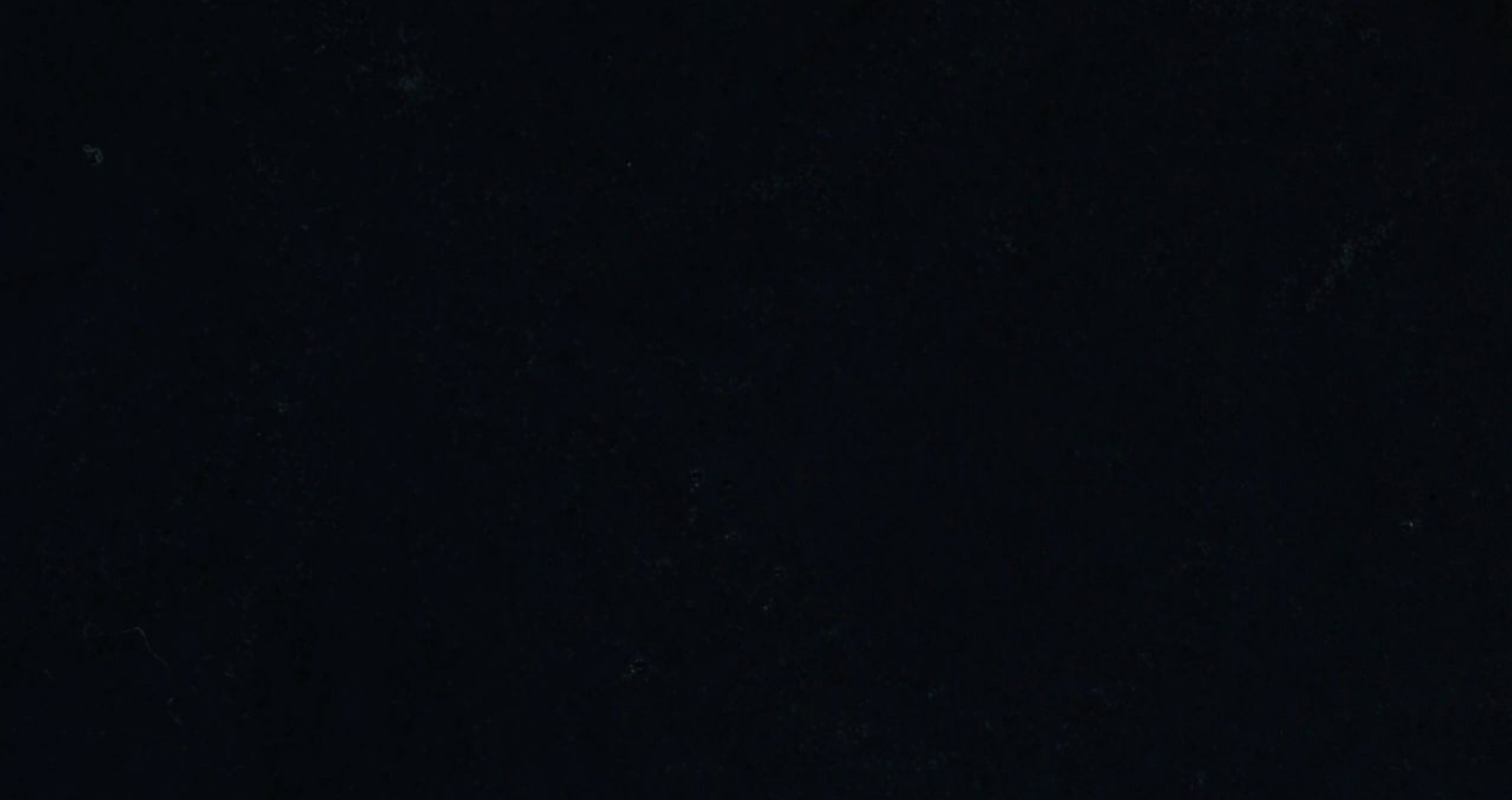


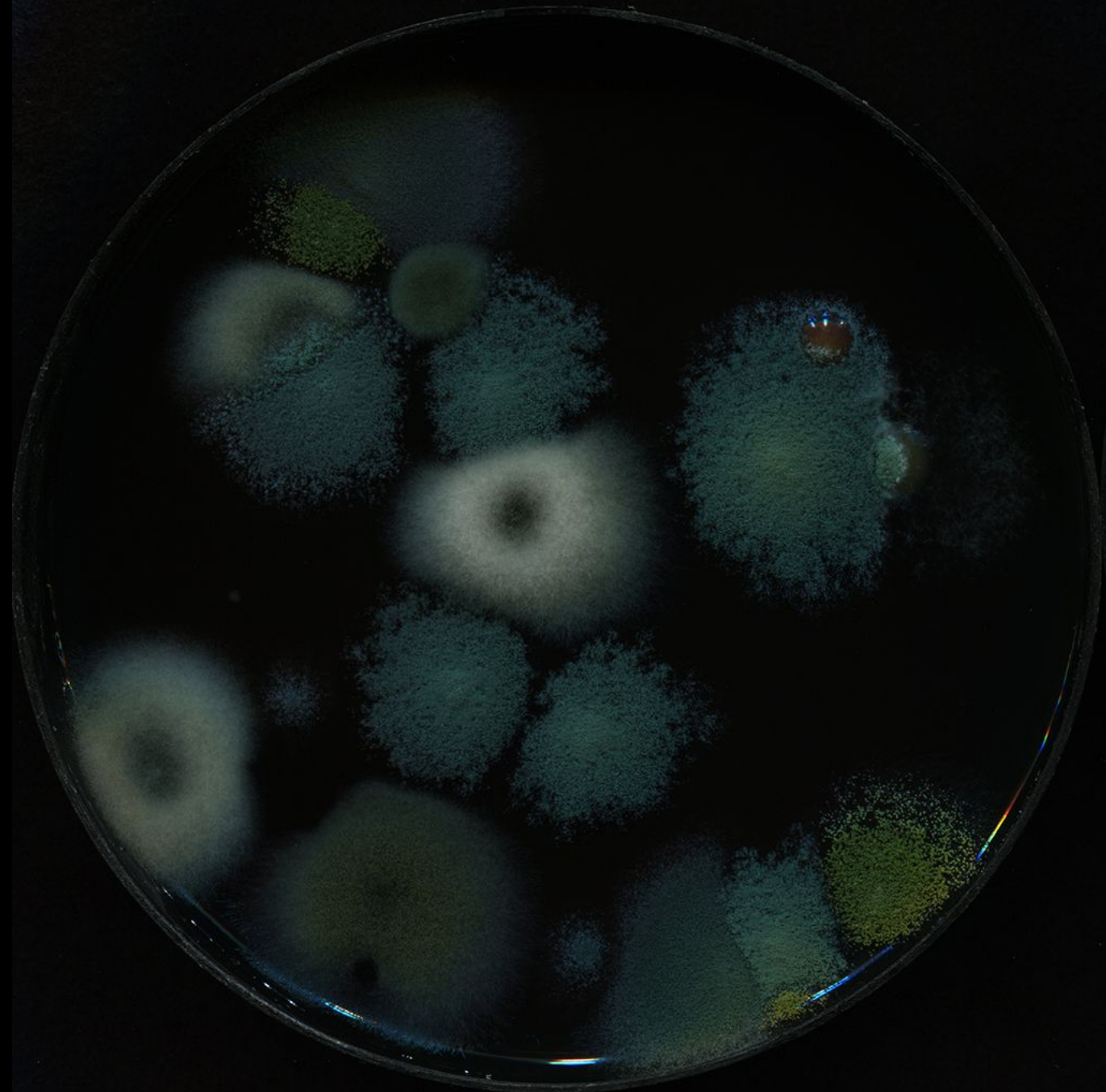
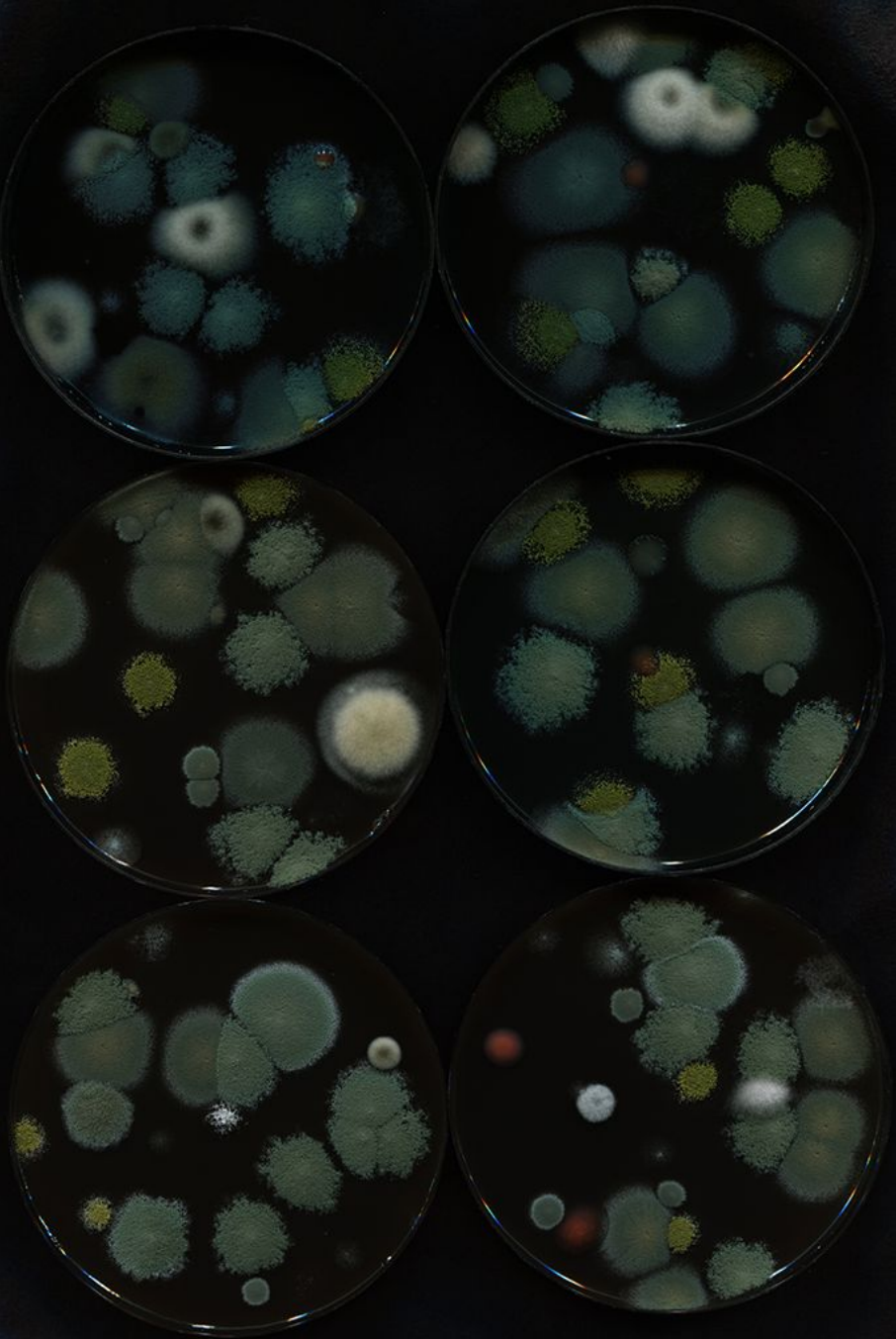
time-lapse imaging

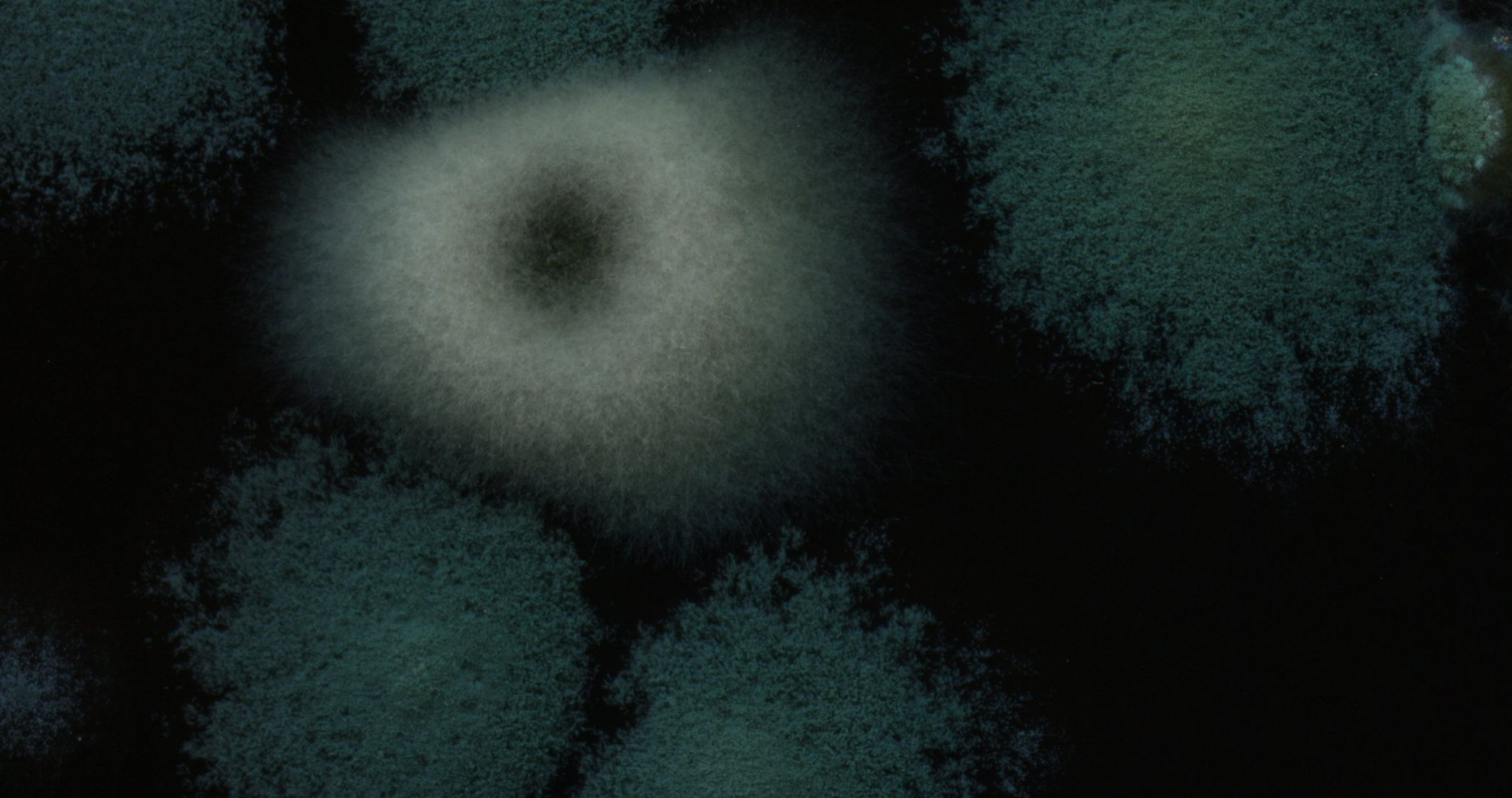
parallax free

high-resolution

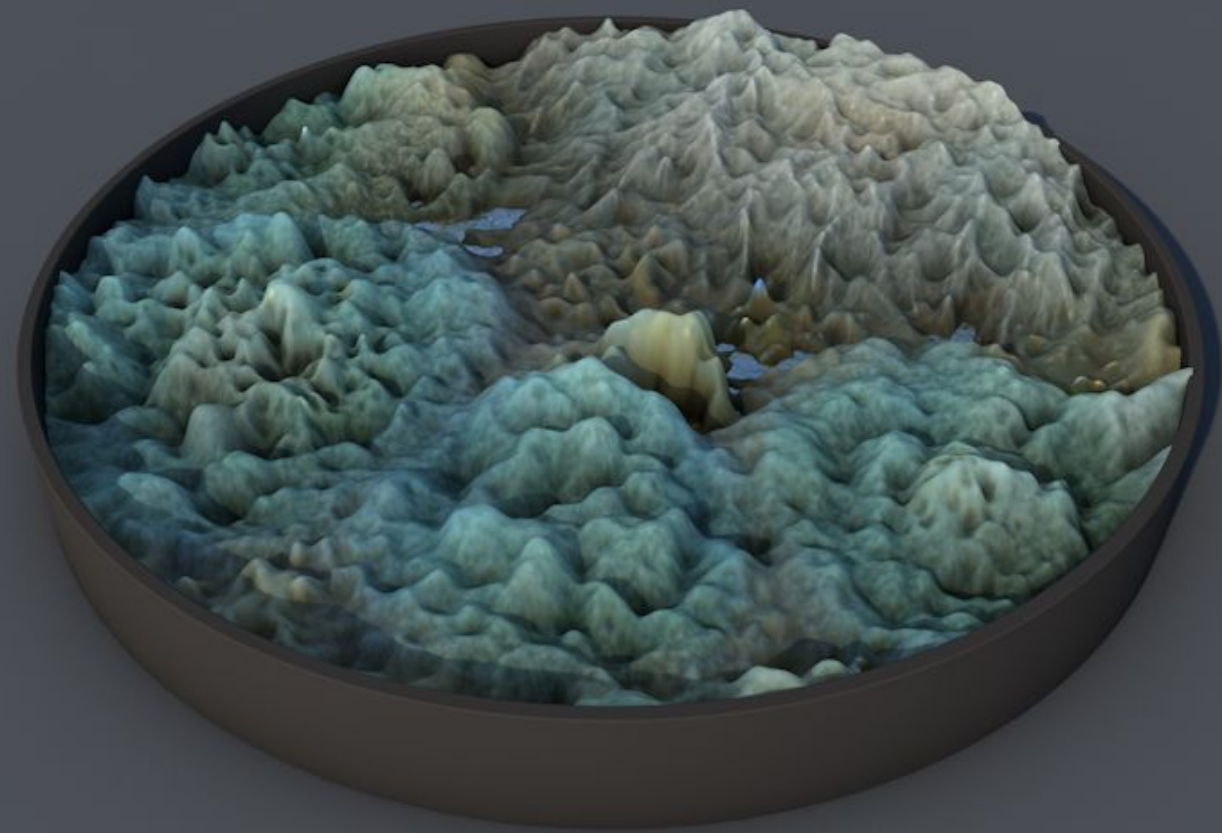
inexpensive

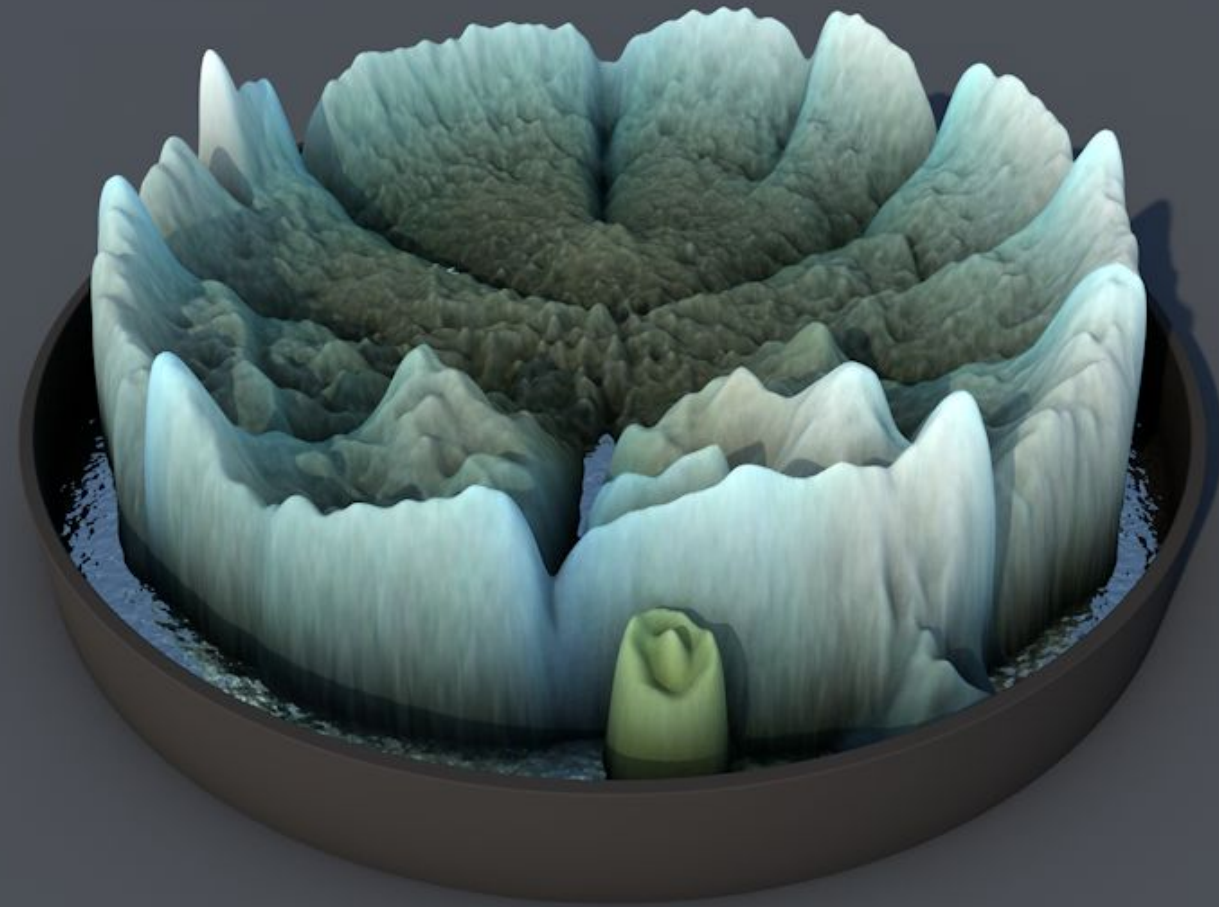


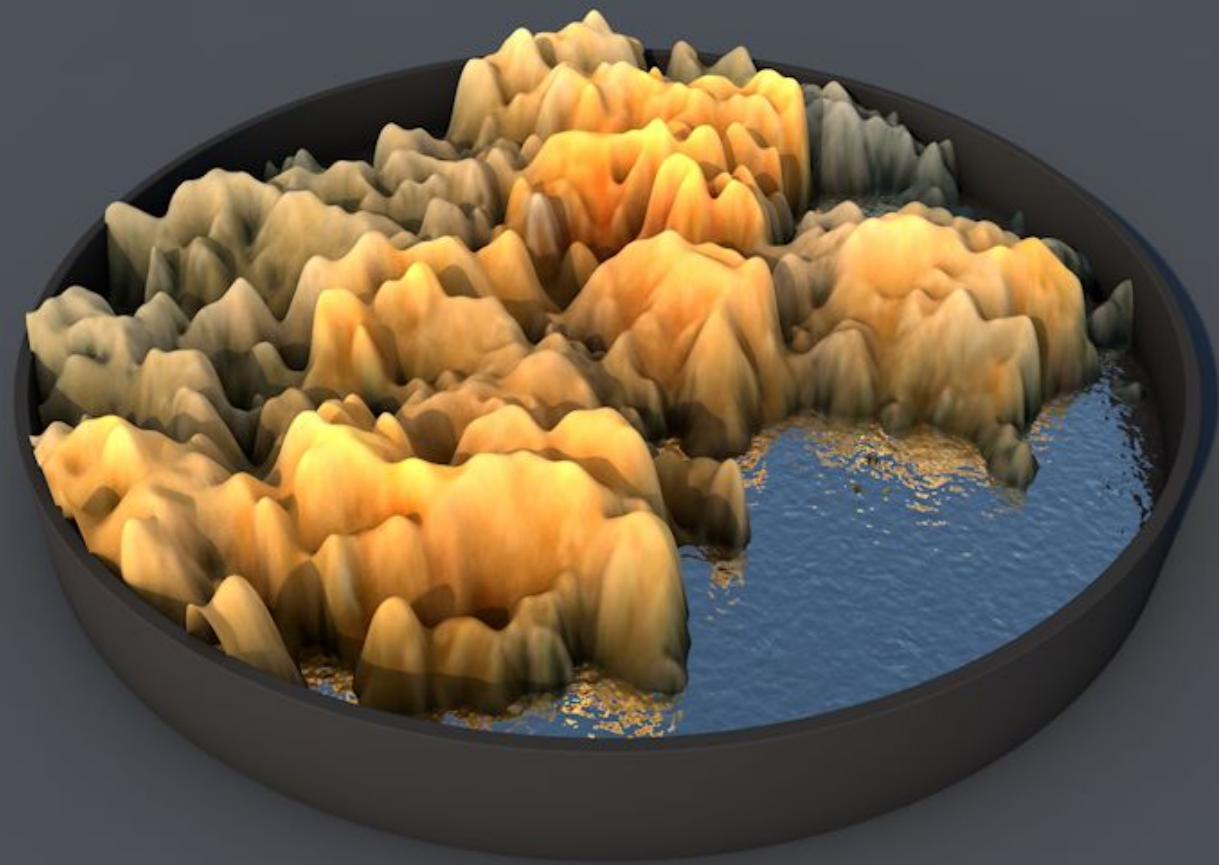




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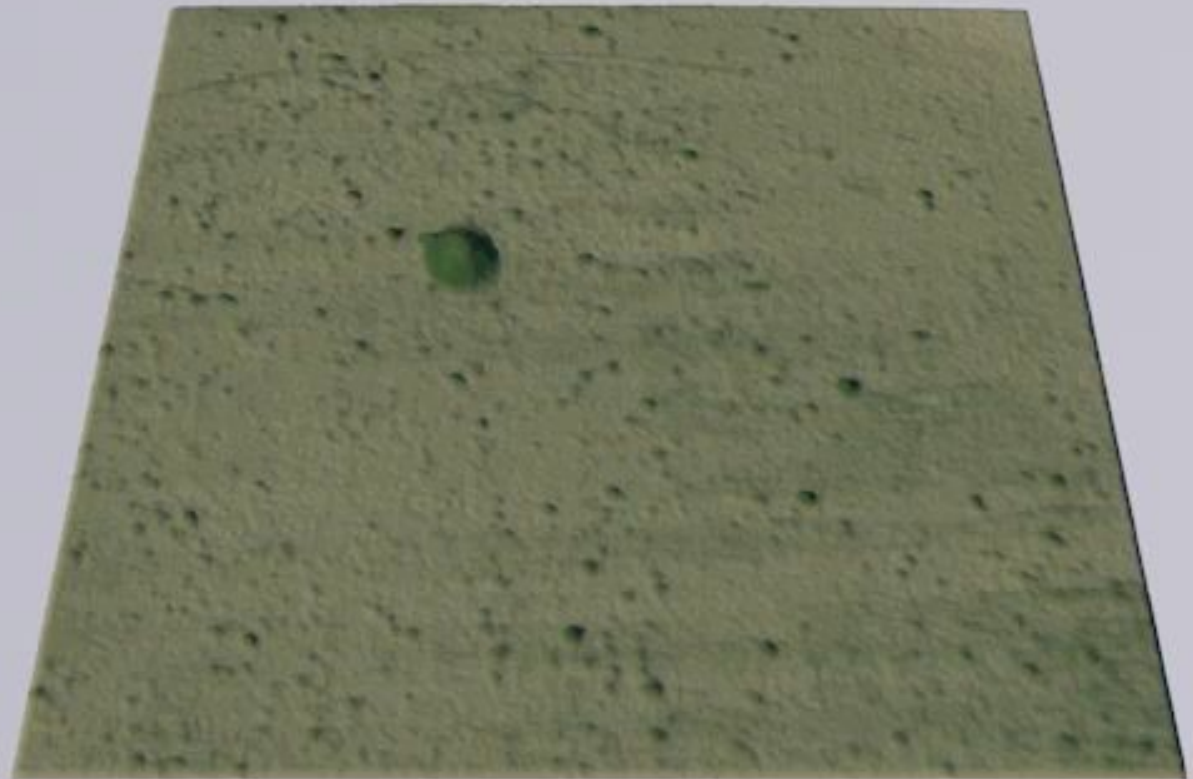


added smoothing (*virtual erosion*)

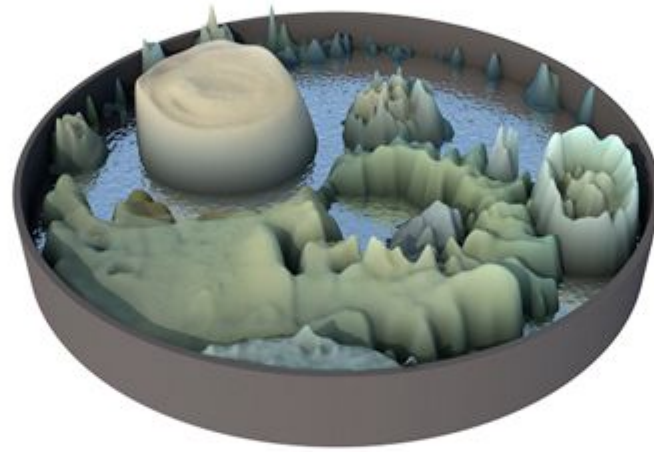
gradient-based snow accumulation



height-based terrain assignment



Time in days: 0



Incubating Worlds

Wim van Eck



Microbial Content Generation for Natural Terrains in Computer Games

Maarten H. Lamers and Wim J. O. M. van Eck*

Leiden Institute of Advanced Computer Science, Leiden University, Leiden, Netherlands

Procedural content generation (PCG) has been applied since several decades to fulfill various game-related design needs. Besides bio-inspired methods, living (non-human) organisms were used in computer games for various purposes, such as behavior generation, data gathering, and player education. No living organisms were used for the generation of virtual terrains in games. Such an approach to terrain generation could benefit from morphological similarity between natural terrains and colonies of microbial

A collection of five vintage tin robots, likely from the mid-20th century, standing in a row on a white surface. The robots vary in design: the one on the far left is compact with a control panel; the second has a large red visor and 'R1' on its chest; the third is tall and slender with a ring on its head; the fourth is shorter with a transparent chest showing internal gears; and the one on the far right is the tallest, with a complex body and a small antenna. A semi-transparent blue banner with the text 'Why, Oh Why?' is centered over the robots.

Why, Oh Why?

Education perspective

Draw *AI-external* students into AI

Publications by students

→ PhD

Research perspective

“Healthy AI ecosystem”

Contextual views

SAILS university-wide initiative

Society **AI** & Life **Science**

Human-centered AI; fair use of AI in and for society



Thank you!

Maarten H. Lamers

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