

PROJECT TITLE

Life in the shadows

Art

Science

Perception

ONE SENTENCE DESCRIPTION

Our project will explore how the concept of a shadow biosphere may inform a series of artistic experiments and experiences to investigate the frontiers of life and limits of perception.

PROJECT DESCRIPTION

For several decades, scientists have considered the possibility of a shadow biosphere, simple or complex organisms which coexist with conventional life on Earth, but which are fundamentally different and unseen.

If such shadow life existed, how would we recognize it, and what kinds of tools or processes would we need to look? A collaboration between Caltech and Stanford University called The Boundaries of Life (BoL), seeks to answer these questions, and may be standing on a philosophical precipice, ready to lift the veil on a life force which has evolved in parallel to our own.

Working with BoL, our project will explore how their research may inform a series of artistic experiments and experiences which investigate new ways of perceiving and engaging with the world. We want to consider how these potential discoveries will affect our society in the spiritual, political and sociological spheres and how humanity may react to the unsettling and exciting news that we are not alone. We are interested in learning from people and cultures whose world views differ from our largely western secular position, particularly those who have spiritual or artistic practices which are integrated with the natural world. Could it be that they have observed the tiny environmental anomalies which scientists are now looking for as indications of shadow life? Might there be knowledge systems which fall outside the scientific method which prove equally illuminating?

Our partnership with BoL gives us access to their diverse collection of scientific data and training in the preparation and processing of our own samples to create a unique dataset of approximately 100,000 images. In light of the interplanetary implications of our work we also have received enthusiastic support from senior scientists at NASA's JPL, including Dr. Mike Russell, Head of the astrobiology research group, and Dr. Kevin Hand, Deputy Chief Scientist for Solar System Exploration.

We have identified four key phases of our project: discovery, planning, execution and reflection, which have been detailed in our implementation plan. This will include a series of live art workshops that we will develop and execute, which will investigate ways to disrupt established mental frameworks, which serve to reinforce pre-existing beliefs, thereby developing a new sensory vocabulary in light of the new reality shadow life represents. The insights gained during these workshops will inform concept development for a large scale built environment, designed to inspire a sense of awe and appreciation of this new materiality.

At the end of the program, we will have articulated at least three concepts for large scale installations, prototyped materials and technology required to realize one of these concepts and developed digital products to facilitate public engagement with the shadow biosphere concept and our work. Through our proposed activities, we will gain a deeper understanding of the human and emotional implications of the shadow biosphere and articulated the possibilities it presents for new forms of artistic expression, created a large and publicly available dataset of images using an electron microscope and engaged the public imagination in the possibility of alien life on Earth.

Schema47 began as a self directed research group in 2015. The core members have a fluid skill set, with expertise in site specific installation, planetary science, participatory performance, robotics, music and composition, computational biology, movement, programming and user experience design.

We are attracted to the Art+Technology program as it shares our spirit of experimentation, dedication to rigorous conceptual thought, excitement concerning new technologies and innovative approaches to art creation. Involvement in the program would provide us with the resources to make the most of our partnership with BoL, and an important contribution to the emerging discipline of biologically driven art. It would have a profound effect on what we are able to accomplish over the next year as a collective, and an enduring impact on our individual practices and careers.

ARTIST BIO - SCHEMA47

ZOE SCOGLIO

Zoe Scoglio is an artist from Melbourne who uses performance, video, sound and installation to create interdisciplinary, site-specific and participatory work. Bringing together equal parts mysticism, formal inventiveness and eccentric humour, recent projects explore the points at which the human and geological worlds intersect. Exploring notions of time, origin and morphology, Zoe's work engages the varied cultural, political and personal narratives we create about this rock we call home.

Graduating with a Bachelor of Media Arts (Hons) at RMIT University in 2008, Zoe has since worked nationally and internationally on solo and collaborative projects, and as a video designer and videographer for dance, theatre and opera. Her geologically inspired performance *Shifting Ground* (Arts House 2012), won a Green Room award for Outstanding Production (Hybrid Category, 2013) and recently toured to London and to Tramway in Glasgow.

TOM ANDRE NORDHEIM

Tom Nordheim is a roboticist and planetary scientist. His research focuses on the icy worlds of the outer solar system, such as Saturn's moon Enceladus, which may be a habitat for life beyond Earth. He is currently a NASA postdoctoral research fellow in the astrobiology and planetary chemistry group at the NASA Jet Propulsion Laboratory in Pasadena.

As a roboticist and space engineer, Tom has worked on scientific experiments flown to the Earth's stratosphere, instruments on rockets and satellites as well as robots which explored the subglacial lakes of Antarctica. He holds a Bachelors degree in Space Science and Robotics from the University of Wales, a Masters degree in Space Studies from the International Space University and a PhD in Space Physics from University College London.

DAVI ORTEGA

Davi Ortega is a computational evolutionary biologist. He holds a bachelors degree in physics from the State University of Campinas (Unicamp) in Brazil and a PhD in computational biophysics from the University of Tennessee. During his career as a scientist, Davi worked in a variety of projects ranging from optical atomic clocks as a guest researcher at the National Institute of Standards and Technology in Boulder, CO to molecular dynamics simulations of bacterial chemoreceptor at the Oak Ridge National Laboratory using the Titan supercomputer. Now, as postdoc at Caltech, he is interested in the underlying fundamentals that explains the evolution of complexity in biology.

Finally, Davi also collaborates as a data scientist to the votenaweb.com.br, an initiative to empower citizens to influence, in real time, the choices of congressmen and senators in Brazil.

PRUDENCE REES-LEE

Prudence Rees-Lee is an artist who draws her training in classical and experimental music, literary theory, craft and computer programming to create collaborative interdisciplinary work with a focus on combining analogue and digital mediums. Her critically acclaimed solo album, *Court Music from the Planet of Love* touched on sounds from across the spectrum of popular and obscure music to create a quasi-orchestral psychedelic fantasia. Her music videos have been exhibited by the National Gallery of Victoria and the Melbourne International Animation Festival and resin craft work exhibited and sold in galleries internationally. Recently, she has been supported by the Australia Council for the Arts and Creative Victoria, and by residencies at The Getty Villa (US) and Flor de Sol (Bolivia). She has performed throughout Australasia, the United States and Europe and is a regular collaborator with award winning, experimental theatre company Four Larks.

As a technologist she develops prototypes of digital interfaces, consults on content strategy and user experience and has a particular interest in machine learning and human computer interaction. She holds a Bachelor of Arts (English Literature and Critical Theory) and Bachelor of Music from the University of Melbourne.

SEBASTIAN PETERS-LAZARO

Sebastian Peters-Lazaro is an interdisciplinary performance artist from Northern California. He graduated from the Department of World Arts and Culture at UCLA, with a Major in Cultural Studies. Sebastian's work in performance has taken him from Los Angeles, (Yu Dance Theatre) to Taipei (Sun-Shier Dance Theatre), to Melbourne Australia, where he co-founded Four Larks, to make "junkyard opera" in unusual locations. Sebastian acts as Choreographer/Designer/Production manager of Four Larks. Last year, they returned to Los Angeles, working with the Getty Villa performance lab to develop *Orpheus* later staged in a textile warehouse in downtown Los Angeles, and just finished their critically acclaimed production of *The Temptation of St Antony*.

Most recently, Sebastian has been a member of WXPT, a dance company formed by Los Angeles Artists Taisha Paggett, with residencies with Clock Shop at the Bow Tie Project, and at LACE in Hollywood. He also works art directing experiential pop ups for advertising firm HeLo in and around Los Angeles.

Vanguard artistic manifestations have been imperative to help society cope with revolutionary new realities and we propose to participate and pioneer the artistic exploration and human reaction to this exciting discovery that science is poised to make.

Rather than communicate the science of the shadow biosphere, we will take it as a point of departure in considering what techniques, ethos and equipment will be required to develop a new sensory vocabulary to understand and experience realms which lie outside our natural tools of perception. In doing so, we will consider the role of the physical and subtle body as conduit for knowledge and experience, and re-evaluate aesthetic categories such as the beautiful and the sublime.

We will create a highly unstable feedback loop between artistic experiments which introduce the search for shadow life, and the public psychological, emotional, spiritual reaction to them. We will look for the points where participants experience awe, delight, a perceptual shift, or sensory confusion. We will continually iterate on our initial experiment to intensify these moments. This process will leverage our backgrounds in creating immersive, participatory experiences and incorporate emerging technologies at points where it feels relevant and appropriate. In addition to physical experiences, we are interested in extending our research to include digital and online interactions, dramatically expanding our audience. It is impossible to anticipate where our experiments will lead, and we are proud of that. We view unpredictable and chaotic outcomes as a prerequisite in discovering new modes of artistic expression and experience.

We want to create experiences catalyzed by purposeful use of new technologies, but driven by the desire to inspire awe and wonder, awakening imagination and self awareness in an era where it has never been more critical to reassess our role and impact on our environment and the Earth's biosphere.

The techniques and methodologies being used by BoL to detect shadow life will be similar to the strategies scientists will employ to look for signs of life in other parts of the Solar System in the future. By exploring what technologies and sensory experiences may be most useful for creating art which relates to the idea of hidden life, we will presage the artistic interpretation of the possible discovery of life beyond Earth, for example by NASA's exploration of Mars and Europa.

Part of our involvement in the program would be identifying and pursuing the technologies that would best serve the artistic and conceptual framework of our ideas, as they arise in reaction to the public feedback and engagement. Given the varied skill set of our collective, the use of technologies including microscopy, robotics, lasers, programming, 3D printing and biologically derived material, have been discussed as realistic possibilities. These technologies present new ways of interacting with objects and ourselves, and facilitate radically different techniques for art making necessary to create the new forms of art we aspire to identify.

The existence of a shadow biosphere destabilizes our idea of what it means to be a biological being and could dismantle humans from our perceived position at the top of the evolutionary pyramid.

This notion of relative superiority has been challenged before with the realization that viruses and bacteria dominate the biosphere but humans managed to evade such unsettling thought, maybe until now.

By re-aligning our role in our planet's ecosystem, we will promote discussion around what it means to be human in the Anthropocene. This new epoch is distinguished by significant human impact on the Earth's geology and ecosystems. This impact is being felt in climate change and the accelerated rate of species extinction. Advances in technology and culture have positioned us as a global threat to the Earth. In light of the effect we are having on the known world, our project will facilitate dialogue between experts in science, technology and the broader public, about what effect we might be having on a microbial world, or even on shadow life, and what effect the shadow biosphere could have on us.

Colonization on Earth has been coupled with violence, displacement and an assumption of absence. As we face the possibility of interacting with non-Earth life, we risk creating ecological disasters by contaminating places like Mars, repeating our species' shameful history of colonization. By engaging with ideas of shadow life, we hope to inspire empathy towards these prospective alien life forms, potentially making humanity's exploration of the cosmos a more considerate process.

Our project hinges on assessing public response to shadow life and the development and delivery of a continuous series of participatory experiences with various demographics to observe the human response to these paradigm shifting ideas.

Identifying the form that these experiences will take is a key part of our project.

We will also deliver artist talks, facilitate panel discussions between artists and scientists, and create an online portal to share written and visual documentation of our process, and where potential collaborators from around the world will be able to share in real time their related artistic activity with the public.

DATA

Our scope is ambitious and inclusive. We hope the data generated by our research will instigate a new wave of artistic expression in LA, around the world and even in space, to be reimagined in contexts we could not predict, and inform other research endeavors in fields such as art, philosophy, design, architecture, psychology, and neuroscience.

Boundaries of Life have offered to take approximately 100,000 electron microscope images of samples provided by us in addition to access to the half million other images taken from samples collected in exotic environments on Earth, such as submarine hydrothermal vents and hot springs at Yellowstone National Park. This unique and as yet unpublished dataset will be released to the wider community, and we hope it's public dissemination will provide new aesthetic frameworks which inspire all types of creative output, from plays, poems, visual art, dances, formal research projects and casual discussions.

During our public workshops, we will be probing the psychological and physiological states of the public as they react to and participate with our work. We expect to record and process the interactions and responses of this audience and release not only the observational material, but also statistics based on questionnaires, games and experiments. Extending our experiments to include online interactions will allow us to track analytics and observe real time interaction metrics.

Thank-you for reading
about our research.

If you would like more information or are
interested in collaborating, please get in
touch.

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