MindSpaces

Art-driven adaptive outdoors and indoors design

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D1.5

Open calls to external parties v1

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Abstract

Two Open Calls to artists and creatives were launched and disseminated in websites and social media so that they would be able to participate and contribute on MindSpace's design process. After the end of each call, the applications were cross-read by an internal and external jury committee. This deliverable is a progress report with the results of each phase of the Open Calls.

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History

Version	Date	Reason	Revised by
0.1	19/02/2020	ToC creation	Beatrice de Gelder Nefeli Georgakopoulou
1.0	27/02/2020	Final version	Beatrice de Gelder Nefeli Georgakopoulou

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Executive Summary

This deliverable is the first version of the open call for external parties as documented in the project proposal and the DoA. More specifically in this deliverable the organization of the open call is presented along with the internal and external jury. In addition, the deliverable describes the selection procedure together with the selection criteria. Moreover, the proposals of the six selected artists are briefly outlined. The implementation procedures are also described in order for the artists to be able to start collaborating with the MindSpaces consortium officially.

Abbreviations and Acronyms

OC	Open Call
AR	Augmented Reality
VR	Virtual Reality

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1 INTRODUCTION

Two Open Calls for Artists were conducted. Each was posted to the Mindspaces Website and disseminated through the project social media channels. It was also announced in the Vertigo Network and shared by all consortium partners. Applicants were asked to define their own scope of research (related to Mindspaces objectives), itinerary (consortium engagement) and deliverables (models, prototypes, artworks). Emphasis was placed on achieving the EU goals of contributing to artistic mobility, shared cultural landscape and supporting the professional development of artists, while creating a research community where art and science interface and make contributions to each other and technological developments can be inspired by artistic practice and inquiry.

2 ORGANIZATION OF OPEN CALLS

2.1 Preparation of the open calls

The preparation of the Call, the linking with the Vertigo platform, interactions with potential artists, answering questions about the Call from artists was done on a continuous basis by H. Levy. Once all artists selected he continuous to be in charge of the interface between the artists and the project partners.

2.2 Open Call general overview & Requirements

The residency was open to artists of all types and experience, but preference was given to those whose practices have previously engaged with science, emerging technologies, and/or interactive installations, AR/VR installations, architectural design and art in public spaces. At the 1st call could artist and creatives could apply for a sum of 60.000eu max for a duration of 18Mo that includes travel and material budgets and at the 2nd call they could apply for a sum of 40.000eu max for a duration of 12Mo. This can be paid in installments and is conditional on monitoring of the progress. Residents will be expected to achieve their project aims, contribute to the overall project and write a report of their experience as a member of the MindSpaces team.

The call was open worldwide. The residency requirement is that a minimum of 30% of the time has to be spent on the premises with the main collaboration partner(s). Details of the procedure were uploaded on the project's website (http://mindspaces.eu/open-call/) and the submission procedure uses the website including links to the Starts residencies platform.

2.3 Dissemination of the open calls

The dissemination material includes the following instruments:

- Website
- Newsletter
- Explanation video
- Social Media

2.3.1 **Website**

On the homepage of MindSpaces website, there is a vertical arrangement of sections, one of them is dedicated to the open calls for artists about the project. By clicking on it the user is transferred to the open call page to read additional information.

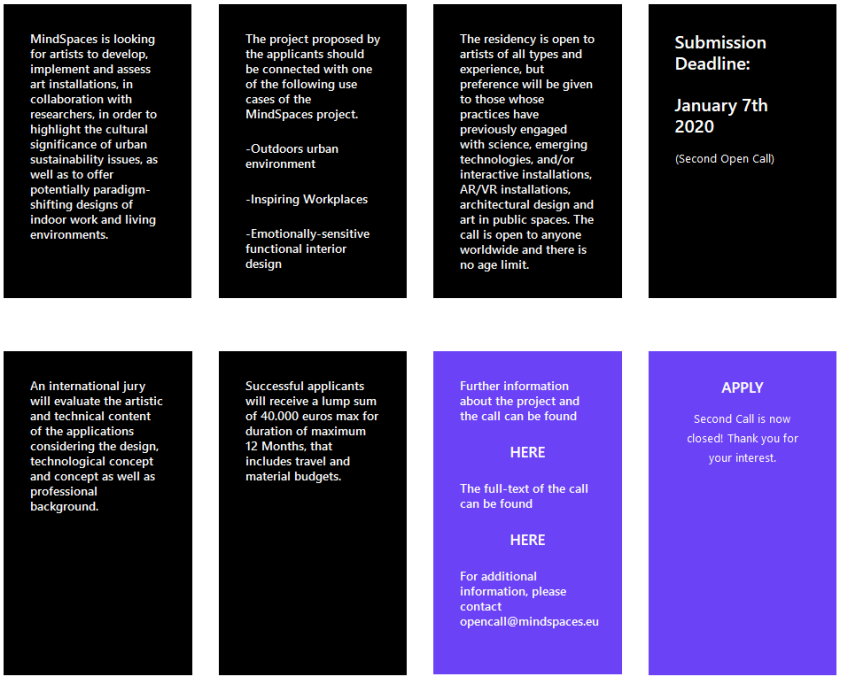


Figure 1: Open Call page on MindSpaces website

2.3.2 **Newsletters and**

In both open calls several newsletters were released. See appendix 2.

Additionally the call was announced on the S+T+ARTS website.

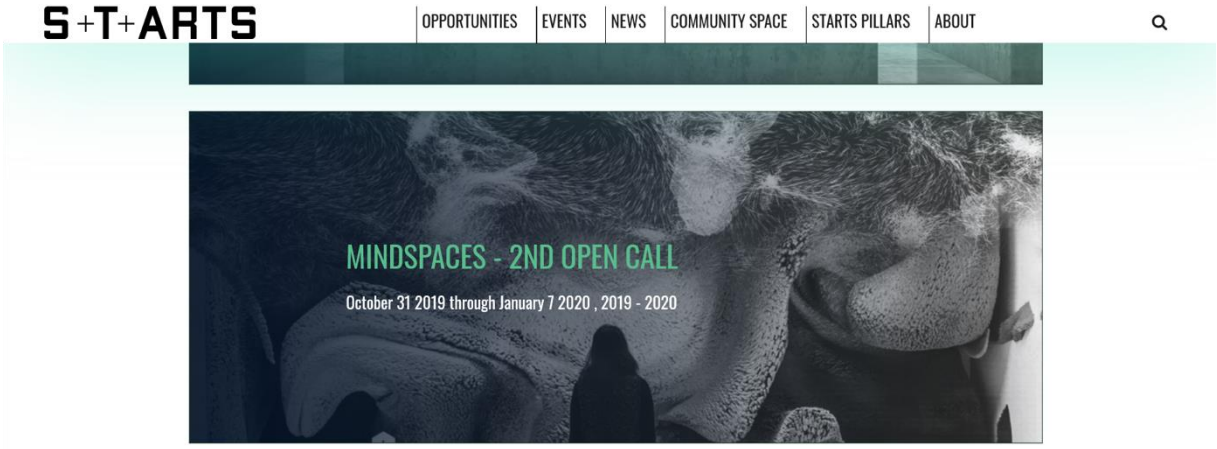


Figure 2: Open Call announcement on S+T+ARTS website

2.3.3 **Explanation video**

An explanation video that combined simple and concise language, appealing imagery and attractive animations was made in order to capture the audience's attention. Its main information was what the MindSpaces project is about, what technologies are used and how the artists can be involved. Also basic information about the residency was explained regarding the budget, the duration, the deadline etc. The link of the video is the following **https://vimeo.com/339520841**

Figure 3: Screenshot of the open call explanation video

2.3.4 **Social media**

MindSpaces consortium established a constant presence in relevant social media channels regarding the open calls, which was also presented on the website. (Facebook, Twitter, Linkedin, Instagram)

Figure 4: Open Call page on Twitter

3 OPEN CALL SELECTION PROCEDURE

3.1 Open call 1

During the 1stopen call, from 19/4/2019 until 4/7/2019, 73 applications were received.

Applications were cross-read by an internal jury made up of 4 consortium members Beatrice de Gelder (MU), Maurice Benayoun (MoBen), Nefeli Georgakopoulou (CERTH), and Alejandro Martin (ESP), who allocated scores for 3 individual criteria: Artistic Potential and History, Art – Science Congruency, and Feasibility/Implementation.

Following cross-reading, applications were ranked by overall score and the top ten were shared with additional jurors engaged for their expertise in the arts. These jurors included Zoe Grey (Senior Curator WIELS Centre for Contemporary Art), Catherine David (deputy director of the National Museum of Modern Art (Musée National d'ArtModerne) at the Centre Georges Pompidou.), and Pedro Gadanho (Former director MAAT – Museum of Art, Architecture and Technology, Lisbon).

The physical meeting of both internal and external jurors took place at Brussels on 18th of July 2019.

3.2 Open call 2

During the 2nd open call, from 4/11/2019 until 31/01/2020, 38 applications were received.

Applications were cross-read by an internal jury made up of 4 consortium members Beatrice de Gelder, Maurice Benayoun, Nefeli Georgakopoulou, and Alejandro Martin, who allocated scores for 3 individual criteria: Artistic Potential and History, Art – Science congruency, and Feasibility/Implementation.

Following the cross-reading, applications were ranked by overall score and the top ten were shared with additional jurors engaged for their expertise in the arts. These jurors included Katerina Gregos (Independent curator), Nadia Gerazouni (Independent curator and director The Breeder, Athens) and Katerina Koskina (former Director of the National Museum of Contemporary Art, Athens). The physical meeting of both internal and external jurors took place at Athens on 31st of January 2020.

3.3 Selection criteria

The evaluation is made by the following Selection Criteria. Each evaluation criterion is marked on a six-point scale from 1 (low) to 6 (high).

•Artistic quality: based both on previous works by artist (selected portfolio) and on the originality of targeted artistic work and developed vision in relation to the Tech-Project technology.

•Art-science congruency: synergy between the Tech-Project and artistic thematic and methodological approaches.

•Implementation: Quality of the workplan (process, schedule, milestones, specification of respective roles and proposed collaboration framework), relevance of consolidated budget with targeted actions.

4 SELECTED ARTISTS

4.1 Open call 1

During a jury meeting in Brussels on 18th of July 2019, 3 artists were selected: Haseeb Ahmed, Sarah Derat, Jakob Steensen. While Ahmed and Derat are moving forward, following meetings in Barcelona, Steensen recused himself from the project.

4.1.1 Jakob Steensen

Jakob Steensen proposal was to work on a deepsea immersive installation that tells stories about types of microbes living in deep sea vents (small underwater volcanoes). The project was to explore and share questions of how to use environmental data meaningfully, and how to design experiences capable of impacting people in the long term. It would also explore how immersive technologies can change our perspectives on time and scale, as well as ideas of individuals and the environments they live in.

4.1.2 Haseeb Ahmed

Haseeb Ahmed proposes a project that addresses artificially constructed atmospheres in workspaces. The aim is to direct virtual architectural modelling, scanning, and sensing tools towards rendering computational fluid dynamics of a workspace. Their goal is to use these hermetic environments to see how workers and machines shape and share the single fluid medium of air, medium that the artist is familiar with through their previous decade long work. TheMindSpaces Platform real time fluid simulations of a workspace will be used to inform VR artwork. The artist is familiar with 3D modelling (Rhinoceros 3d) and animation programs through his artistic practice. Up to now the work has primarily focussed on analogue visualizations of turbulence patterns using smoke with lasers in wind tunnels. During the MindSpaces residency the artist will explore computational fluid dynamic simulations.

The artist will use the full **18 months** of the residency and the entire **EUR 60.000** budget to complete a new installation based artwork accompanied by a booklet, website logging of the accumulated research and a short-film that moves beyond just the documentation of the project. The artist has divided the period of their residency into trimesters. The first trimester is dedicated to introductions with the MindSpaces team and facilities dedicated to research questions based on particular facilities and conversations. The research will be systematically documented through an online webpage. This documented material will be composed as a printed booklet along with its outcomes. During that time frame there will be several on-site visits to the relevant MindSpaces partners to seek out associations and most relevant resources available to cultivate the project further.During the second trimester the engagement with partners to tune research and production will deepen. During this phase a series of models and drawings will be elaborated in dialogue with partners. As virtual models they employ the remote collaboration and spatial capacities pioneered by some of the partners and pave the way for the final

work. These models are documented and will be included on the webpage and the print documentation. The models and prototypes are distilled into drawings for fabrication of an installation artwork to be realized in the final trimester of the residency period. This penultimate product is the result of the resources, research, and dialogues throughout the year and as such cannot be defined before that process is undertaken.

4.1.3 **Sarah Derat**

Sarah Derat is showing interest in the process of memory formation & consolidation as well the neural connections between toolmaking and communicating. They aim to combine art and tech via AR/AI and/or VR toexplore these fields of research while relying strongly on physiological signals and visual data to monitor emotional states. The artist intents to explore the potentialities of Art and Tech to help preserve and improve neurological, cognitive and emotional functions, while also taking into consideration in their approach the crucial question of mental health. Art & Technology can merge & brainstorm on how to help people -either by suggesting a modification in their living space or by composing an artwork that can function as a tool tailored to seek improvement in people's well-being. Recent uses of VR apps and headsets in elderly care homes have given positive results on patients suffering from the late stages of dementia and Alzheimer's, in order to improve general mental health and trigger back memories. In this context, they want their residency to be focused on ethically gathering physiological and behavioural data -centred onthe necessity of improving people's emotional and psychological state while also addressing issues of social isolation and lack of social interaction. The research could lead to the conceptualisation of an interactive artwork or system using VR that encourages seniors and their relatives to participate in a joint action, as a way to consolidate an intergenerational emotional bond. More specifically, the artist is interested in the idea of sharing/passing on memories, knowledge, skills, and how they can be recalled, transmitted and re-appropriated, while taking into consideration that their input is accessible to someone who is not tech literate. Their expectations include the production of a work as part of the residency using AI and/or VR , but also writing and making public engagements as a way to efficiently disseminate the production of the residency and its ambitions internationally. The artist will use **EUR 49000** for a **12-month** residency.

4.2 **Open call 2**

During a jury meeting in Athens on 31st of January 2020, 4 artists were selected: Emanuel Gollob, Joao Martinho Moura, Michael Sedbon and Emmanuel Van der Auwera.

4.2.1 **Emanuel Gollob**

Emanuel Golub intends to achieve a series of VR spaces, VR interventions and physical interventions for existing offices, which optimizes their parametric aesthetic in real-time to the emotional state of the viewer with the aim to increase the employee´s productivity and emotional well-being.

In times of constant busyness, technological overload and the demand for permanent receptivity to information, doing nothing is often seen as provocative and a waste of time. People seem to always be in a rush, stuffing their calendars, seeking for distraction and the subjective feeling of control, unable to tolerate even short periods of inactivity. However, especially at work, enjoying a moment of inaction and introspection while letting our minds wander and daydream may be more productive than constantly keeping us busy with doing something.

The artist will use the MindSpace technologies "Physiological signals for emotional state estimation" and "Visual data for human behavioural analysis" to set up a real-time emotional state evaluation feedback process, evaluating if the person is getting closer to a relaxed mind-wandering state or not. In case of an EEG cap with a high number of electrodes the Non-Task brain network, which is assumed to be responsible for creative thought processing, could be measured directly, if not he would propose to start with a more complex Non-Task signature of emotional state, behavioural analysis, heart rate, skin conductivity and/or facial expressions.

Regarding the parametric adaptation and the interaction, the artist will set up a high dimensional space of possibilities, each parameter with a range of 0 to 255 and a GAN algorithm as a behavioural element. Using a generative learning algorithm as a behavioural element allows to increase the space of possibilities and at the same time increase the individual adaptation, as well as the variance over time. Using a realtime generative behaviour also allows making the learning process interactively experienceable with its proposing, listening, learning and responding elements.

Referring to the measurability mentioned in the Use Case description the artist will focus on the improvement of productivity and emotional well-being of individuals and teams at the workplace. He will use quantifiable productivity and subjective well-being tests to evaluate and compare different VR spaces, VR interventions and physical iterations and use those insights as guidance for further iterations. The artist is proposing **8-month** residency with a lump sum of **EUR 27.000.**

4.2.2 **Joan Martinho Moura**

Joan Martino Moura intends to research and develop an in/out of body experience to be discovered by the population of the city of L” Hospitalet de Llobregat, using VR means and devices, giving a new meaning to the ‘connected’ part of our everyday lives. Specifically, in this collaboration with MindSpaces’s team of researchers and experts, the artist would like

to explore the connection with the city, its history, its hidden or visible details, its multiculturalism, and its expansion.
The main focus of the artists proposal collaboration with the MindSpaces program will allow the participants to experience multiculturalism of the city, raising its cultural value and increasing the user's awareness of issues related to its history and expansion. The artist intends to contribute with his artistic background and also with my real experience in the complicated technical details underlying the goals of this program.
a) With the exploration of the city's data files; b) using VR technologies; c) with the exploration of embodiment/ disembodiment and teleportation techniques; d) with the real sense of the difficulties related to artistic residencies; e) with good cooperation between all parts; d) with the good feeling to fail and to success; I intend to provide a good contribution to this project.
As is the aim of this project, the artist would like to create new types of spatial human-centered interactions within the urban context, as the main objectives of the Pilot Case 1.

The artist is proposing **12-month** residency with a lump sum of **EUR 34.061,45.**

4.2.3 **Michael Sedbon**

Michael Sedbon intends to establish designs and cultural frameworks for biological machines and systems. He will work on this design framework through the development and making of life sensing technologies (bio-sensors). The design of these devices will aim at being integrated with real-time design systems in VR and in material space, through custom made environment and Mind Space technologies.
To address these problematics, it appears fundamental to design and build an apparatus that would match the timescale of the processes measured as it appears obvious that technological innovation and biological ones don't append at the same pace.
This robust and autonomous apparatus will be cheap and easy to deploy in order to make it available widely. The artist intends to produce an art installation that will bridge together the concepts explained in the previous parts and the MindSpace goals and technologies as a way to communicates on what would have been achieved throughout the residency. To do so, he will produce an experimental setup where human actors will be able to interact with non-human users of urban infrastructure and technologies. This collaboration will be mediated through VR and an interactive physical model of a city that the users will be able to navigate and interact with. The information and structures regulating these streets and buildings will be modulated by the array of sensing technologies described in the other parts of the applications. This interactive system will be thought out, conceptualised and produced in close collaboration with the MindSpace teams as well as the different cultural and industrial actors involved in the project. The artist is proposing **12-month** residency with a lump sum of **EUR 40.000.**

4.2.4 **Emmanuel Van der Auwera**

Emmanuel Van der Auwera intends to use this residency to acquire knowledge and access to emerging technologies, sharing my own research and artistic output with the consortium,

which will contribute to its aims and research. His contribution would include: collection and submission of external data related to unpredictability in public and private spaces and brainstorming and testing tools with partners. In addition he will create a work of art that becomes part of the Mindspaces legacy through public events and discussion, an innovative art installation related to PUC-1, which will aim to raise visibility regarding cultural value and increased awareness of concerns related directly to the filtering of information, which indirectly relates to environment, mobility and a myriad of other civic issues. The artist is proposing **12-month** residency with a lump sum of **EUR 39600.**

4.3 Implementation

On the side of MU considerable time was spent fine-tuning the procedures, the modalities of payment to the artists, the establishment of a contract involving the legal department of MU, advice from the accountancy department and the like.

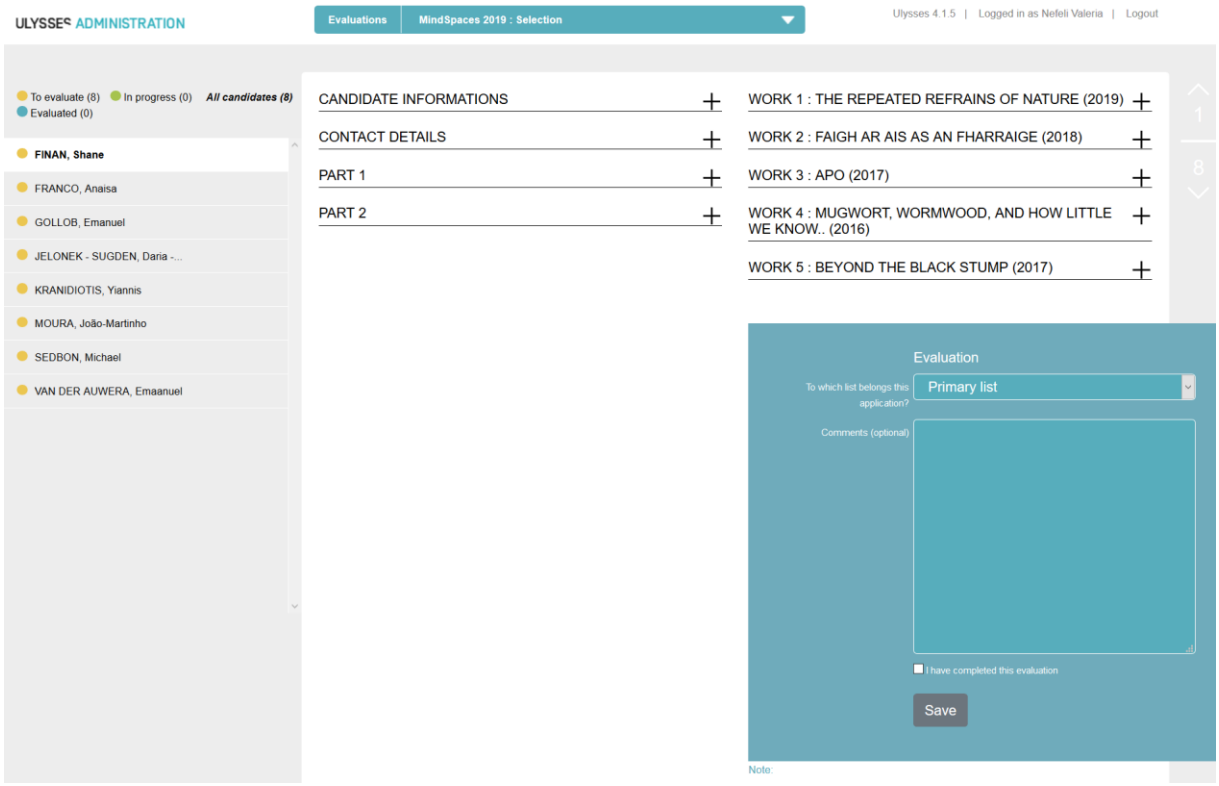
5 CONCLUSIONS

At the meeting of the consortium in Athens partners were of the opinion that 6 artists involved in the project would be an ideal number as partners generally felt that these interactions are very involving and as much these interactions are highly appreciated for the novel perspectives they offer to both parties, they are very time consuming for the partners.

The artists selected in call 1 were present and participated in the 2th meeting in Athens in January 2020.

A Appendix

A.1. Screenshot of Vertigo platform



A.2. **Photo of the jury meeting in Brussels**

A.3. **Photo of the jury meeting in Athens**

A.4. **Documents related to the call uploaded on MindSpaces website**

MindSpaces Open Call (description for website)

Mindspaces is a Lighthouse project belonging to the STARTS initiative. The main goal of the Starts is the inclusion of artists in innovation projects funded by the research programme**Horizon 2020**. To encourage collaboration of research projects and artists, STARTS funds **STARTS residencies** of artists in technology institutions and of scientists and technologists in studio of artists.

Mindspaces is a rich and complex project where artists are meant to collaborate at all levels with the partners and the different methodologies and techniques. The support of the EC allows Mindspaces to offer residencies, which could last for up to 12months. This long-term approach adds incentive for outstanding artists, enhances the potential for outstanding transferable results and allows time for residents to integrate into the research framework. Furthermore, it reflects the very notion of a Lighthouse project.

Mindspaces will offer a number of artist residencies. Residents will become part of the research team, which aims to develop, implement and assess art installations that will highlight the cultural significance of urban sustainability issues, as well as offering potentially paradigm-shifting designs of indoor work and living environments.

Mindspaces (www.mindspaces.eu) is a 3y research project financed by the European Commission STARTS/Lighthouse projects started on Jan 1th 2019. In this project artists, scientists, architects, engineers and technology experts closely collaborate under a novel working model scheme to propose innovative designs to address societal challenges faced by cities as they expand, and the evolving needs in functionality and emotional resonance of modern day workplace and housing interiors. Art has the capacity to transcend established theoretical and conceptual frames and act in cross-disciplinary ways, as it provides space for what is called “lateral” thinking, that is to address issues with an ‘out of the box’ approach.

Mindspaces Residencies are cross-disciplinary residencies of a collaborative nature. They offer no fixed accommodation, but include required travel to partner laboratories, research hubs and meetings. Interested applicants are expected to read the project description and propose a specific project, which contributes to the spirit and objectives of Mindspaces. The residency is open to artists of all types and experience, but preference will be given to those

whose practices have previously engaged with science, emerging technologies, and/or interactive installations, AR/VR installations, architectural design and art in public spaces.

The two main challenges for the artists are:

- To think, research and propose artistic inputs, installations or actions which will be discussed with specific technological partners of Mindspaces for the creation of AR/VR solutions
- Propose how to dynamically adapt the spaces (in VR) based on the information coming from MindSpaces technologies and from the environment (e.g. citizen's emotions and feelings captured from social media, detected behavior of people around the area of interest, day, time, weather etc.).

Successful applicants will receive a lump sum of 40.000eu max for a duration up to max 12Mo that includes travel and material budgets. This can be paid in installments and is conditional on monitoring of the progress. Residents will be expected to achieve their project aims, contribute to the overall project and write a report of their experience as a member of the MindSpaces team.

The MindSpaces platform

A platform encompassing the above technologies will be provided to support the artist(s) and/or architect(s) in designing solutions for both indoor and outdoor environments as described. This platform will offer effective support in defining/conceptualizing a project, in scanning and virtualizing environments, researching them, and in capturing and visualizing emotional and behavioral data in real, or in near real time, and in using it to refine, improve, and adapt designs. The platform is essentially composed of the following three distinct but interoperable tools:

AR/VR tool (responsible partner: NURO)

A AR/VR tool based on Unity 3D will allow artists to set up their installations in virtual space, and conduct tests and simulations. This tool will also support control over parameterized 3D models in real time. It is conceived to help artists in analyzing the sensory input from users while experiencing the spaces in an immersive near real-life environment. A key challenge for the selected artists will be to use their artistic skills in order to translate how the VR (indoor or outdoor) environment can be adapted based on the captured changes in the environment and in the user emotional states

Project manager system (responsible partners: McNeel and NURO)

A project manager system based on Rhino3D will help artists to seed the project with concepts, concerns, locations, and requirements. The seeds will allow automatic search and retrieval tools to compose interesting and relevant datasets for the project. The project manager supports the management of digital resources related to artist's project, including those generated by the different services and technological components developed in the project.

3D editor (responsible partners: McNeel and NURO)

A sophisticated 3D editor based on Rhino3D will allow artists to build their projects and model their solutions. It supports the use of parameterized 3D models that can be connected to live data sources (e.g. sensors) in a custom manner. Artists can program animations, functions, and reactions to control the parameterized models by using compatible tools (e.g. Grasshopper).

The artists will be provided technical support and training in order to take full advantage of the platform.

The MindSpaces technologies

MindSpaces is performing research and development of several cutting edgetechnologies. The selected applicants will be involved in the development, and/or can make use of one or more of the technologies below, in order to propose and implement a work of art in the context of the project use cases.

Textual analysis for extracting user emotions, feelings, and needs from use case related texts (responsible partners: CERTH and UPF)

The collection of texts might include tweets of certain profiles or from particular locations, news describing recent events, user biographies and thoughts, opinions on public and office spaces from art- and design-oriented blogs and forums, etc. Data extracted by CERTH will help UPF understand users' background, their current emotional state, and their opinions on some project related questions. UPF will provide means for generating texts from abstract structured data, for example, to verbalize ideas or augment VR scenes with textual descriptions.

Physiological signals for emotional state estimation (responsible partners: CERTH and MU)

CERTH will provide means to extract users' emotional states through the analysis and processing of physiological signals, e.g. electroencephalogram (EEG), Galvanic Skin Response (GSR) and Heart Rate (HR) measurements. CERTH and MU will develop technologies for

estimating emotional states while users interact with a VR environment and corresponding art installations.

Visual data for human behavioral analysis (responsible partners: CERTH and MU)

CERTH will provide means to capture videos in indoors and outdoors environments. MU will provide a video analysis service that will assess the reactions and behaviors of users in each proposed environment. MU's visual behavior analysis will process video recordings in order to understand the flow of humans either as individuals or as groups. Trajectory analysis, object tracking, human-human interactions and Pose estimation methods will be taken into consideration for the detection of activities and behaviour analysis over time.

Aesthetics and style extraction from visual content (responsible partner: CERTH)

CERTH will extract aesthetics and styles from visual content and provide it to the artists and creatives to build novel 3D-artworks or spaces. The aesthetics information will be extracted either from archival material (cultural heritage artefacts in paintings, images of artwork, video footage) or provided by the end-users. This material could be used as inspiration for novel or culturally-relevant designs.

Semantic representation and data integration (responsible partner: CERTH)

Semantic Web technologies will be used to intelligently combine and fuse the contextual information that is generated through the MindSpaces environmental and physiological monitoring solutions, such as emotions and physiological measurements. The achieved situational and emotional awareness will be translated into emotion-driven adjustments and changes to the 3D model space, fostering emotionally-relevant and functional design.

Space sensing for 3D reconstruction for interior and exterior spaces(responsible partner: U2M).

3D models of the interior workspaces, the houses and the exterior places of city of L'Hospitalet will be available via the platform. Especially in the exterior space scenario, massive 3D data will be produced for the artists to exploit. 3D models of small in house items could also be available. The 3D information will be in the form of 3D models and point clouds and they would also be displayed in VR/ AR environment of the platform. At the same time, the original raw data, which will be collected for creating the 3D content, will also be available via the MindSpaces platform. The raw data will be collected by a handful of sensors and sources, such as images from drones, satellites and vehicle platforms, terrestrial scanners and scanners on vehicle, GPS and IMU signals and historical photographs.

The MindSpaces use cases

The project proposed by the applicants should be connected with one of the following use cases of the MindSpaces project.

Pilot Use Case 1: Outdoors urban environment

Expanding urban areas are at risk of losing their cultural and social character. MindSpaces Pilot Use Case 1 ask to the artists to co-create, within a team of technical members, solutions that promote its cultural, social and environmental assets and improve flow and functionality for increasing social interaction, tourism and economic activity.

The goal of the use case is to produce design proposals for an urban area of special cultural interest. MindSpaces architects and selected artists from the Open Call will use advanced modelling software to produce blueprint documentation of the area, and propose new urban design schemes that showcase its cultural importance, generate new types of social interaction, and draw attention to issues it is facing regarding environmental pollution and mobility (e.g. air or water pollution, traffic congestion).

The public will experience the proposed urban design in the outdoors area itself, through artistic interventions created by the selected artists potentially expressed via media façades and/or new spatial installations linked with an AR or/and VR environment. The art installations may provide direct representations of cultural assets, reproductions or projects on the historical urban fabric, urban challenges, like mobility issues or environmental pollution data, aiming to elicit interest and engagement in these issues from city dweller and visitors.

Additionally, the installations may generate a platform for new types of social interaction within the urban context. User's emotional and cognitive responses will be indirectly assessed by a combination of environmental and physiological sensors appropriately chosen for each installation (EEG, motion sensors, activity sensors, video etc.). The MindSpaces public installations will dynamically change according to the artists' sense of aesthetics, in response to the sensor feedback from the public, so as to arrive at the most emotionally appealing and functional design proposal or/and a proposal which is generated through the collective behavior of the participants.

The use case will be showcased in the city of L'Hospitalet de Llobregat, a city located in the metropolitan area of Barcelona. Being Catalonia's second city, with a population of more than 262.000 inhabitants, it faces major challenges regarding high urban density, high levels

of multiculturalism and an industrial past which has shaped the city. The past 20 years have brought intensive urban, economic and cultural programs creating today a dynamic metropolis that attracts artists, new companies and new population.

Tecla Sala Cultural Center and surroundings is a central area in L'Hospitalet holding several projects on contemporary visual arts regarding training, creation, production and exhibition. It is also a pleasant urban park connecting the north and the south of the city and a future neuralgic area with new perspectives of flows once the intermodal metro and train station will be opened. This area will be the spatial base of work that will host the artists installations, and will also serve as a final exhibition space of the result of the work led by the artists.

Selected artists for this use case will be asked to think, research and propose artistic inputs, installations or actions which will be discussed with specific technological partners of Mindspaces for the creation of AR/VR solutions allowing citizens and other users to experience renewed designs of these spaces, move in them, interact with the others, to assess their functionality and understand their cultural and environmental history and value. More specifically they are expected to propose art-based suggestions on how to dynamically adapt the spaces (in VR) based on the information coming from MindSpaces technologies and from the environment (e.g. citizen's emotions and feelings captured from social media, detected behavior of people around the area of interest, day, time, weather etc.). The final goal consists in introducing innovative designs for outdoors areas which support and sensitize the public to issues like environment, migration, gentrification, future of work, history, culture, etc. The response of the citizens to the proposed solutions will be measured via EEG, physiological and visual sensing, leading to online modifications for improved designs.

To develop their work, artists in residence will have access to particular data (cultural, sociological, economical, historical, etc.) about the space and its users, as well as priority access to artistic studios and specialized suppliers in the area in order to easily produce and implement their artwork.

Pilot Use Case 2 - Inspiring Workplaces

MindSpaces seeks to gain a deep understanding of the relationship between human emotion and behaviour in relation to the spaces, objects, and living environments we design and inhabit. Inspiring Workplaces is a Pilot Use Case designed to test and develop the Mindspaces platform specifically for designing better quality large (over a hundred people) working environments. MindSpaces research partners are collecting and analysingbehavioural and emotional data from people inhabiting workplace environments

physically and virtually (AR/VR environments) to develop design and analysis tools used in designing workplaces. Artists, architects, and designers will leverage the tools and data insights to explore and envision improved workplace environments.

Key goals of this Pilot Use Case:

- To obtain and utilize user data to effectively generate improved workplace designs
- To understand the relationship between the design and organization of workplaces and the social performance of working spaces
- To develop aesthetically and functionally innovative workplaces capable of enabling the dynamic communication that is needed within today's networked society
- To produce more emotionally appealing working environments and catalyse more positive, dynamic and diverse social interaction behaviour in workplaces
- To improve and increase productivity and well-being in office spaces

Designers have potential to guide modern workplace design in unexpected directions, to improve its appeal and effectiveness. To do so we must consider some current cultural office trends that are driving changes in the needs and requirements of effective workplaces. Today businesses are treated as ecosystems required to support and enable increasingly adaptive and interdisciplinary collaborations. More businesses are embracing the Gig Economy which has given rise to the exponential growth of co-working spaces in past 10 years globally. Building owners are increasingly looking to curate not only the type, but size and stage of development of occupiers, to create a synergistic mix of entrepreneurial and established businesses. This requires us to consider designs which are more adaptive and flexible for building stakeholders, business owners, and building users. There is a concerted effort to enabling both curated and unexpected spontaneous collaboration. Our designs must not only allow for such collaboration, but actively encourage and enable more dynamic social interaction and collaboration through connectivity. Additionally, in a war for retaining talented workers, businesses are increasingly considering ways of providing a better work-life balance through increased and diversified amenities, more exposure to natural light and green spaces and pleasant stress reducing working environments which feel less like the cold office spaces of the past.

In this Call, we invite talented artists and creative thinkers to propose ideas, concepts, interventions, and designs for new and innovative solutions to designing more inspiring and effective offices of the future. Artist's proposals should contribute to the ideation and development of, and/or utilize the Mindspaces platform (in the concept of an authoring tool and interaction tools for measuring public reactions via VR and EEG, as described in the above section) and data insights in their conception.

Artists are asked to propose solutions that can be measured to improve the performance of office space design based on considerations such as promotion of emotional well-being,

improved productivity, increased flexibility, and the enabling and encouraging of dynamic social interaction and collaboration. To develop their work, artists and creative thinkers will have access to 3D digital models of potential office space designs, and, for the purpose of the project demo, to the 3D model of the existing workspace, which will be re-designed via the artists contribution, as well as data provided through the Mindspaces platform and should be capable of interacting with these media.

Artists will contribute to rethinking the notion of how offices can be designed as well as by creating interventions and full design proposals for office spaces potentially taking on the following roles:

- Conceptualise fundamentally new approaches to office design which provide productive user requirements / considerations that contribute to the development of the Mindspaces platform
- Design virtual 3d VR/AR interventions for existing office spaces or architect's designs
- Design virtual 3d VR/AR office space designs entirely
- Propose and install physical interventions in real world office spaces

An open demonstration will be finally organized and will showcase different versions of the redesign of a working space, as affected by the selected artists.

Pilot Use Case 3 - Emotionally-sensitive functional interior design

Architectural and interior design has always aimed at creating emotionally appealing and functional environments. But it is only in recent years that emotional effects and the usability/functionality of a designed space are being assessed in an objective, quantifiable manner and in such a way that quantitative data using multiple sensors now shows great potential to support design. Additionally, the widespread availability of digital representations of past aesthetic trends and features enables their innovative reuse and integration in new designs. MindSpaces will combine these trends, enabling the realization of aesthetically sensitive interior design that integrates the end users' responses and leverages specific aesthetic features that appeal to certain target groups.

In the use-case concerning interior design for seniors, the aim will be to create proposals for the redesign and refurbishment of existing homes, or the design of new ones, with the goal of making it emotionally and functionally senior-friendly. Architects in collaboration with selected artists will propose an artwork inspired for a senior individual's living space. The senior will have between 60 and 85 years-old, have no particular health or mental illness and live independently. The proposal is to work on the themes of emotional support and affective state. Indeed, if solutions can quite easily be found for practical issues as they are more explicit (accessibility, security, life rhythm, health…), everything related to affective deficit (solitude, loss) is less addressed.

The art works will be presented to the senior through adapted supports (3D, virtual reality headsets). The artists will be provided with the 3D plan of the senior living space as well as information coming from sensing cameras and interviews about the senior habits in his/her home. The emotional state of the seniors will be measured via VR with non-invasive EEG and physiological sensors, as described in the above sections. This will allow to determine the emotions felt by the senior in interaction with the artwork in his/her living space.

The use case will be piloted on seniors' homes in the city of Paris, in collaboration with project partner eSeniors.

The MindSpaces consortium

Centre for Research and Technology Hellas (CERTH): data collection from sensors (visual data, EEGs, HRs, etc.), crawling web and social media, aesthetics and style extraction, emotion detection and semantics analysis.

Maastricht University (MU): visual behavioral analysis and emotional state recognition from physiological signals.

University PompeuFabra (UPF): text analysis, sentiment analysis and text generation services.

Aristotle University of Thessaloniki (AUTH): expertise in architectural design, urban design and landscape design (natural and urban); guidance in use cases and the evaluation of the proposed designs.

MCNEEL Europe (MCNEEL): 3D design software tools provider and development of architecture and designing software.

up2metric (U2M): expertise in 3D spaces reconstruction; creates immersive 3D experiences for use in Virtual and Augmented Reality apps.

NUROGAMES GMBH (NURO): provides development for adaptive AR/VR environments; orchestrating system integration.

ZahaHadid (ZHA): innovative design solutions and knowledge in spatial design, agent based simulation / analysis, and VR integration.

Maurice Benayoun (MoBen): is a pioneer in digital arts and has strong expertise in interactive exhibition design.

analogNative (AN): is a technology-driven art and design studio and lies at the intersection of media arts and architecture with using machine intelligence.

Espronceda (ESP): has experience in the fields of the culture and art, organizing different, multi-disciplinary, cultural and educative programs.

e-Seniors (ESE): aims at fighting e-exclusion by providing access to and training in ICT to seniors and/or disabled people.

L'Hospitalet de Llobregat (CdH): will bring to the project the context of the city as the living lab of the project.

City University Hong Kong (CityUHK): examines the impact of art approaches on urban, architectural and interior design