MindSpaces Open Call

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 18 months. 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.

Successful applicants will receive a lump sum of 30-60.000 euro max for a duration of min 6 to max 18 Mo 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 technologies

MindSpaces is performing research and development of several cutting edge technologies. 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 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:

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).

AR/VR tool (responsible partner: NURO)

A AR/VR tool based on Maya 3D and 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
The artists will be provided technical support and training in order to take full advantage of the platform.

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 analysing behavioural 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 Pompeu Fabra (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.

Zaha Hadid (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

Applicants can register and upload their material on the VERTIGO PLATFORM
For additional information, please contact opencall@mindspaces.eu