

The background is a blurred image of a hand holding a pen, with a color gradient from blue on the left to red on the right. The text is centered in the middle of the image.

RESEARCH & DESIGN PROJECTS

CLD ITMO UNIVERSITY

ITMO UNIVERSITY

One of Russia's leading higher education and research institutions in the field of IT, quantum communication, photonic technologies, robotics, translational medicine, art&science, and urban studies.

ITMO University is ranked one of the world's top 100 universities in Computer Science and the world's top 400 universities in Engineering and Technology, according to the Times Higher Education subject ranking.

Founded in 1900, today it is home to 11125 students, including 1810 international students from 82 countries with 1320 lecturers and professors currently employed. ITMO offers over 50 MSc and PhD joint international programs with the world's leading universities.

ITMO's 14 international scientific research centers generate advanced knowledge and bring top innovative ideas to the market through an established system of R&D support.



CLD ITMO UNIVERSITY

Creative Lighting Department at ITMO University is a unique centre of applied research and postgraduate international education in the field of Lighting Design in Russia. CLD works closely with lighting industry, local community, and regional authorities.

Its educational methodology is based on the combination of problem-based and human-centric approaches with deep integration of modern technologies (HCI, big data, microelectronics, new materials, smart wearables, IoT, photonics and optics) into the educational process and applied research projects by students and staff.

It attracts not only graduate students with various backgrounds but also people with extensive professional experience in Architecture, Interior and/or Urban Design, Media, and Engineering. CLD's students mostly work on innovative projects that are dedicated to improvement of health and lighting environment leading to sustainable innovation-led growth worldwide.

CLD'S METHODOLOGICAL APPROACH

Design Thinking

Synectics

Interdisciplinary Research

Human-centric

Problem-based

Design Research

Heuristic

Data Analysis

Contextual Design

CLD'S MAIN TECHNOLOGIES

BCI

Eye-tracking

Media Technology

LI-FI

VR, AR

Light ID

CLD'S MAIN DIRECTIONS OF RESEARCH

Health & Lighting

Architecture

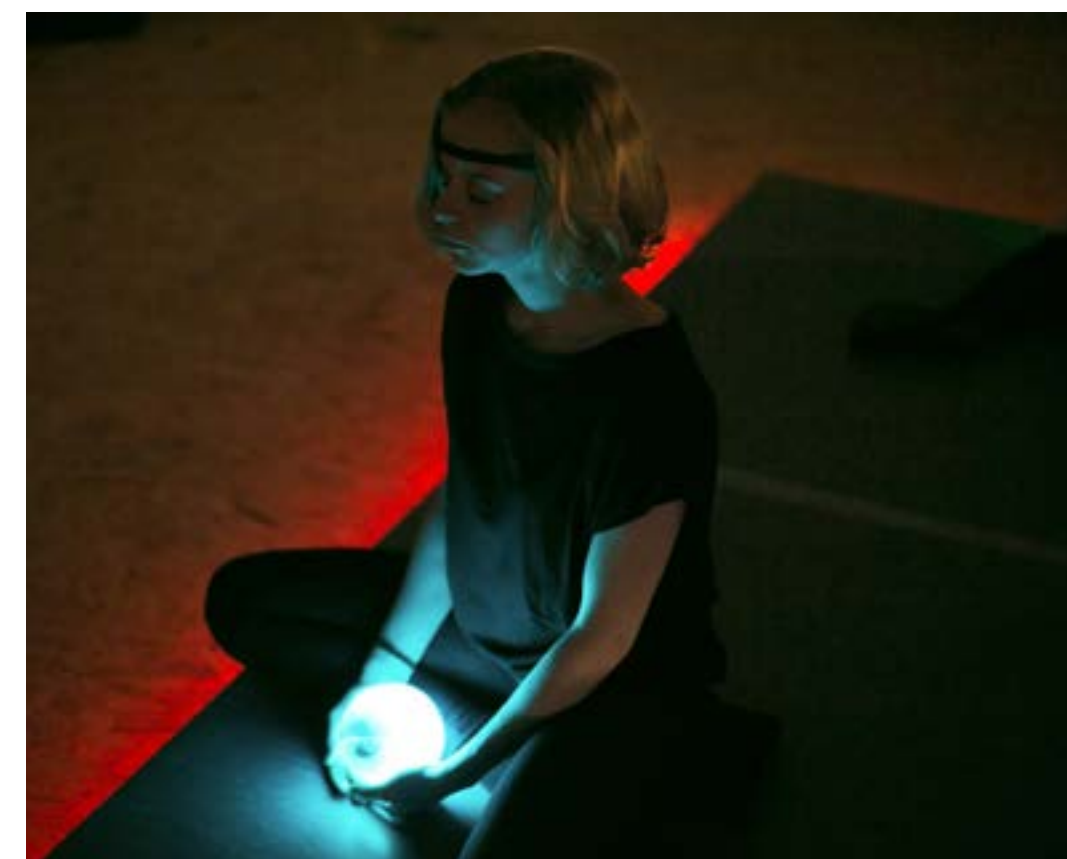
Industrial Design

Urban Environment

Smart Fashion

Multimedia Spaces

Health & Lighting



NEU-THEATER

Author: Yurii Didevich

First presented at the Geek Picnic Festival in 2017

NEU-THEATER is a research art interdisciplinary project with dancers, programmers, neurophysiologists, lighting designers, and media artists.

The underlying idea was to use brain-computer interface (BCI) to read dancers' emotional expressions. That information was processed by a special program and translated into sounds and visual effects on a stage. It was noticed that as dancers got more tired and less emotional, visual effects and sounds started to vanish away but the quality of their physical performance stayed as good as it was at the beginning.

This exciting finding proved that NEU-theater found the right way to capture, analyse, program and express shifts between active and passive phases of mind in a non-verbal way.

STUDENT PROJECT AETHER

Author: Daria Chirimisina

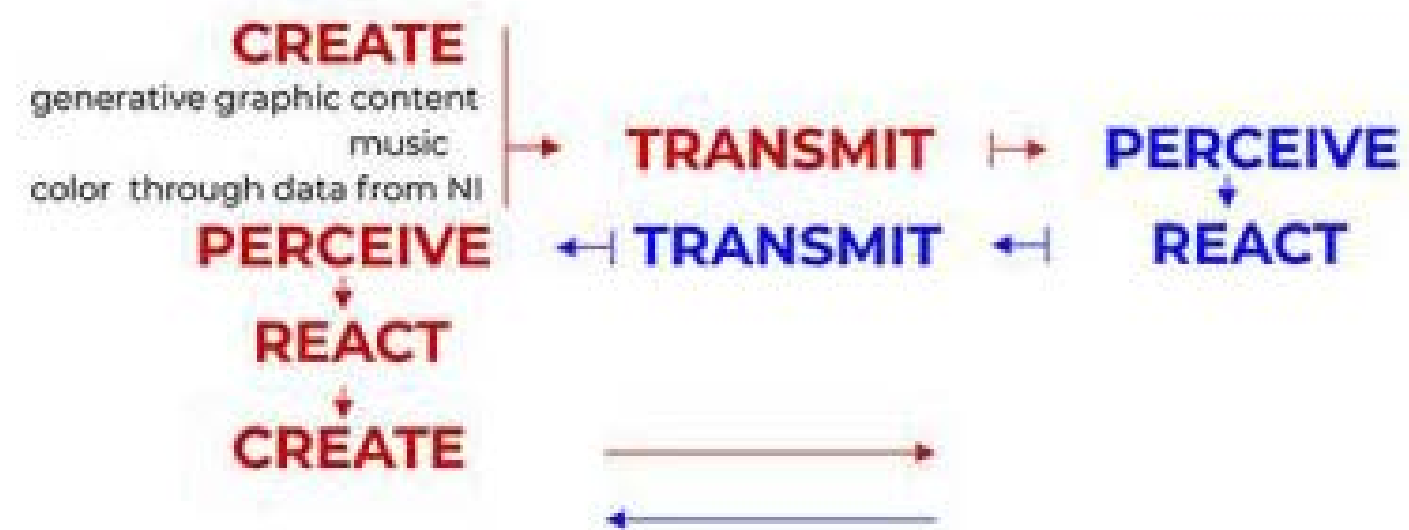
Winner of the LIT DESIGN AWARDS 2017

This is an innovative art and science project designed to create new forms of communication through interactive theatre experience where spectators become actors, lighting artists, and directors of the performance all at the same time.

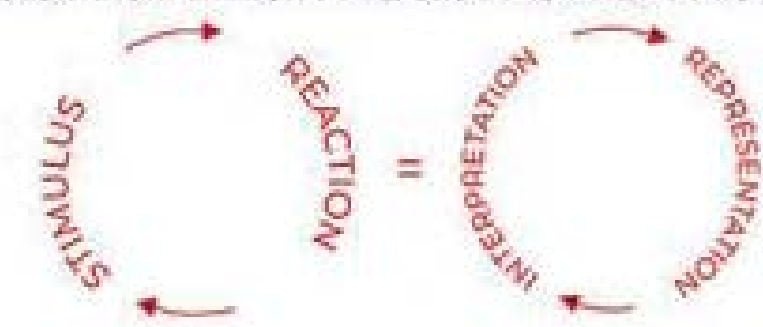
This performance requires the use of two independent spaces. Room 1(R1) is reserved for one participant equipped with BCI. Other participants are placed in room 2(R2) and provided with webcams that transmit image and sound to R1. The participant in R1 can see activity of the other participants in R2.

The BCI records the participant's brainwaves and sends them to a computer system that structures an obtained information through special software application and detects one of the four states of mood: anger, happiness, sadness or rest. Based on this input, the application generates a content for the performance that depends on spectators' emotions and is always unique. It can be played in both rooms simultaneously and, hence, affects behavior of all participants.

Scheme of structure and circulation of information



Circulation of information on a mental level





STUDENT PROJECT NEURO TRACKER

Authors: Daria Chirimisina, Daria Filatova

This project aims to help children with disabilities to reach their full potential through drawing. It was made on the basis of previous research and projects such as NEU-theater and AETHER project.

This is a portable software & hardware system for rehabilitation centers. It helps people with disabilities of the musculoskeletal system to develop creative thinking, control their emotional state and improve their social interactions.

This educational device includes a BCI, an eye tracker, and a drawing system that synthesizes records of brain and visual activity and translates it into data. This allows one to draw artworks on projection screens, computer monitors and walls inside game rooms.



VGORAY PROJECT

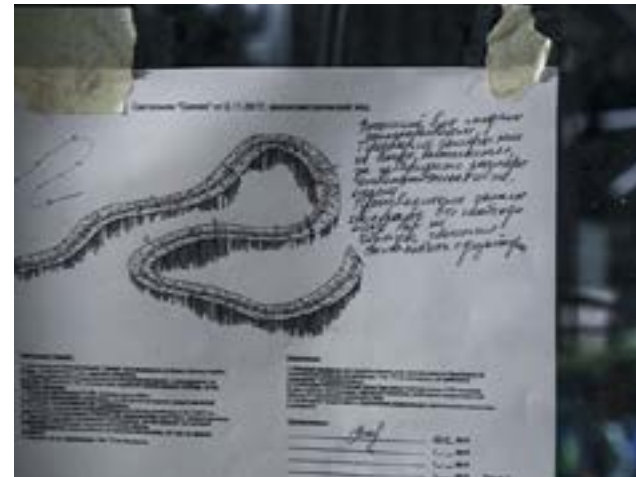
Authors: Lux Aeterna Theatre, Nikolai Matveev

Winner of the LIT DESIGN AWARDS 2017

It was developed by an interdisciplinary group of researchers from CLD ITMO University and artists from Lux Aeterna Theatre (Budapest, Hungary) who designed an exclusive audiovisual scenario combining laser projection and sound.

The main idea behind the VGoray project is to develop a mobile restorative environment that can be used to increase productivity and well-being in the workplace. Spending just 15 minutes a day in this restorative environment may be enough to significantly increase team's overall productivity, cohesiveness and engagement, reduce costs caused by stress.

Industrial Design



INTERIOR PROJECT 'NOVOTEL ARKHANGELSK'

Concept and Design: Sundukovy Sisters
design&architecture studio

Implemented by CLD's designers and engineers: Ilya
Smilga, Roman Antonov, Juliia Mashkova



The first fixture is an interior light installation consisting of 1000 LED tubes of different length. These tubes form a copper screen that is capable of playing a chosen video content. Its control system can receive an ordinary video file and convert it into an abstract glow, which is regulated by a special console or an operator in real time.

The second fixture is a 7 meters tall interior light installation that consists of 36,000 LEDs and consumes 1.5 kW of electricity. All LEDs have uniform glow over the entire length of their tubes and can be dimmed from one wireless remote controller.



OPUS

Authors: Taras Mashtalir, Vladimir Antonchenko,
Pavel Pankratov

OPUS's sensor system analyses space within the sculpture, organises collected data in accordance with the Pythagorean principles and turns it into harmonic oscillations. OPUS reproduces a unique sonic scale and pulsating radiance that depends on activity of people near it, allowing them to control an audio-visual space of the sculpture with their collective actions.



STELLA

Authors: Taras Mashtalir, Pavel Pankratov

Stella is also sensitive to slightest movements of the audience near it. Sensors collect data, translate it into different harmonious sound and light effects. Combination of various sound effects can change depending on settings, scenarios and musical scores chosen by sound designers.

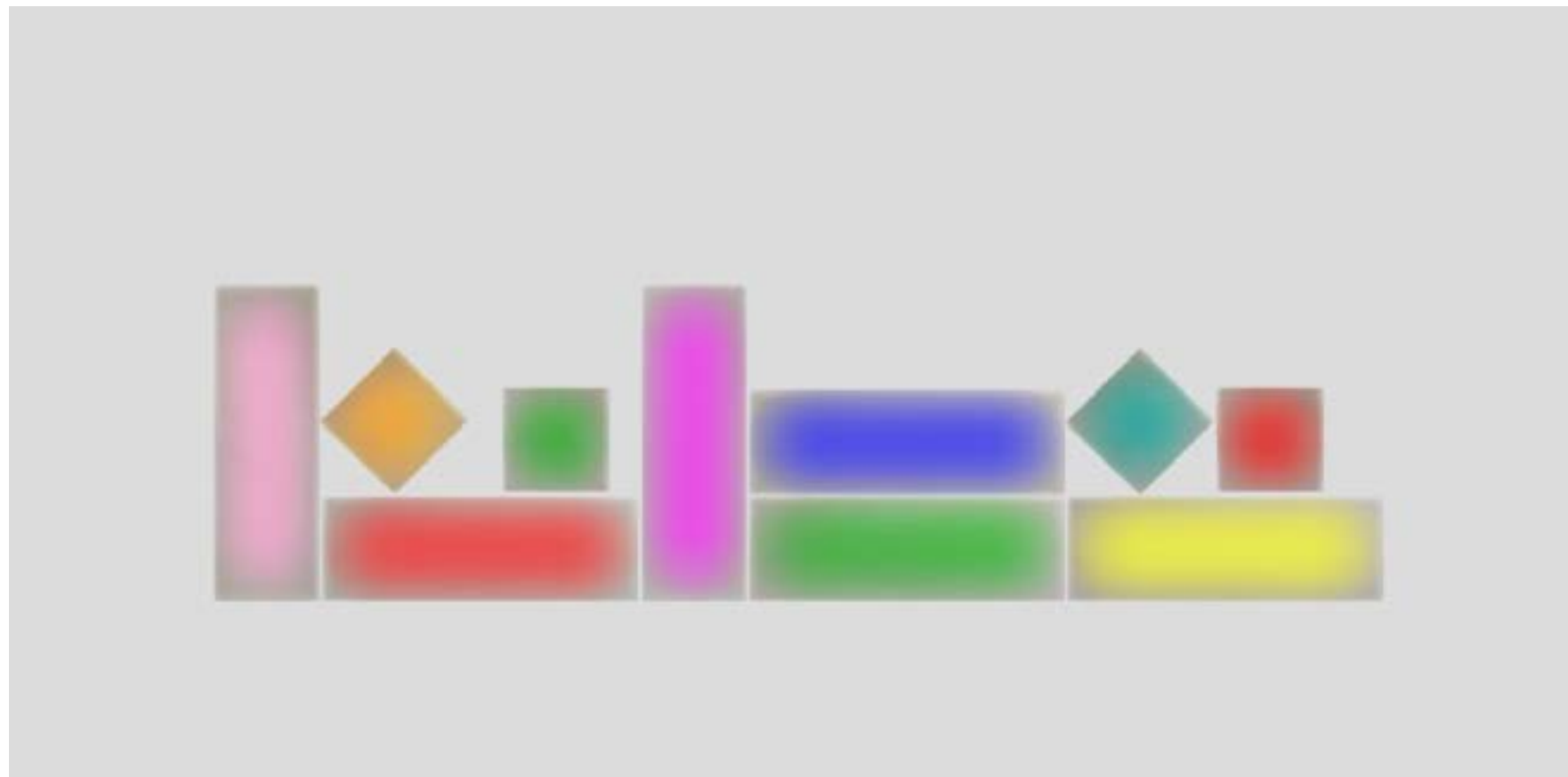


PALETTE

Author: Roman Antonov

Cubic-shaped toys were created for the 'Svet' foundation that provides assistance to children with cancer. When a child places a luminaire toy on an object, toy detects the object's colour, generates it and emits light of this unique detected colour. When placed on few objects, the toy will emit light of both colours.

During the game, children are introduced to the additive synthesis of colours which is used in digital technology.



UNITY

Author: Roman Antonov

Unity is a device that allows to use a crowd of people to create large-scale interactive shows during major city events. Each user of this device becomes a 'pixel' and the crowd turns into a giant media screen that reacts to the sound and orientation of people in space and creates various visual scenarios. The device is controlled by the ARTnet protocol.



WIRELESS MULTIMEDIA AND CONTROL SYSTEM

Implementation: Roman Antonov, Kirill Shamritskii,
Nikita Paschenko, Dmitrii Chukhin

This project was developed for 'SazonovStudio' and was put into action at the St. Petersburg Ice Palace stadium during its Media Show. CLD's designers built control system and wireless multimedia into heart-shaped objects.

It demonstrated how one lighting technician can regulate lighting scenarios of more than one object depending on the event's program.



CRYSTAL

Author: Valeriia Lukinskaya

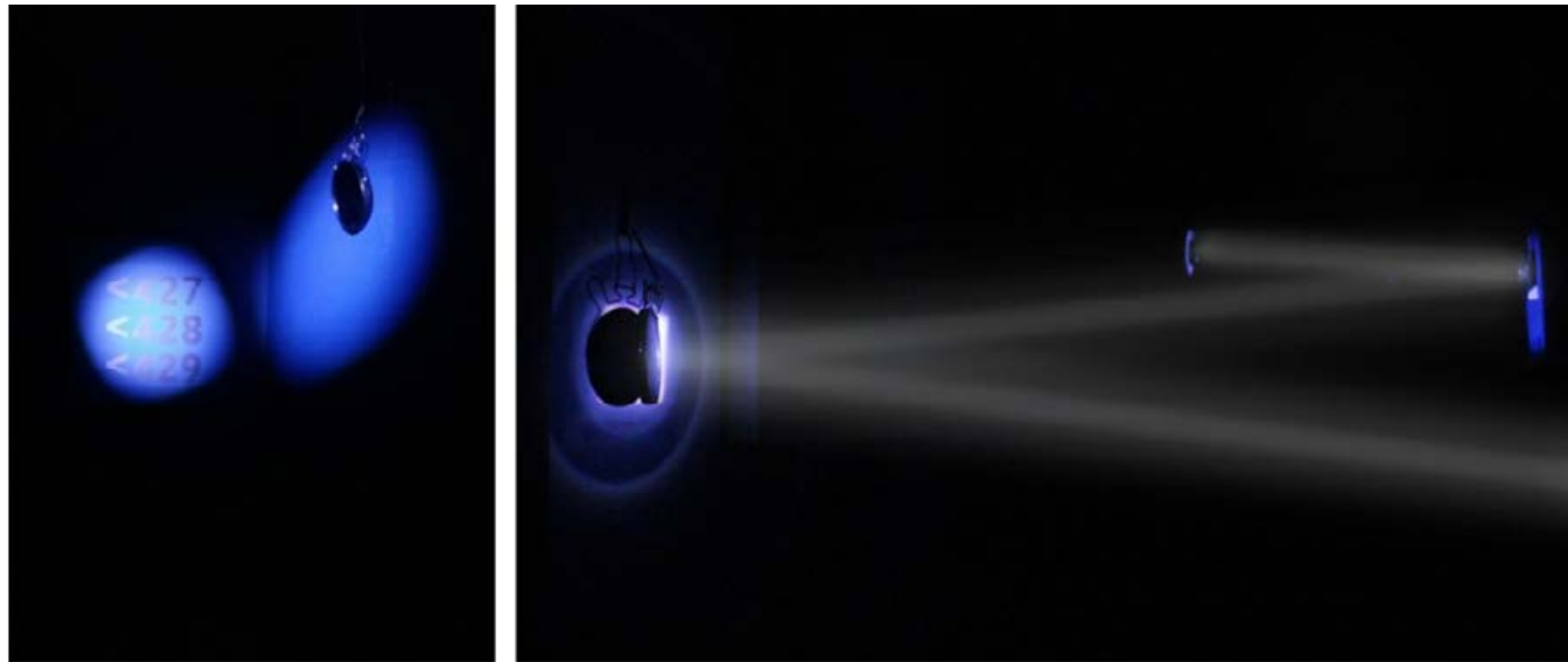
The installation is an interactive, crystal-shaped, lighting fixture made of concrete. The light stream that comes out of it creates water glare effect on a ceiling. It detects movements, therefore, as more people come into the room the more dynamic the light stream becomes. The main idea behind is to show how energy efficient such fixtures can be and how harmonic they look in places with urbanistic design.



STUDENT PROJECT LIGHT TRACE

Author: Juliya Lyubakova

It is an interactive lighting fixture that registers students' attendance when they tap cards with NFC-chips against the fixture. Light that fills the perimeter of an object changes its colour from red to warm white as more students enter the classroom.



STUDENT PROJECT Natural Glow

Author: Daria Chirimisina

Natural Glow is a system of mirrors installed along two sides of a corridor. It catches natural light and transports it on an unlightened wall. During winter time with low sun condition, one can use the Gobo projector that translates an abstract dynamic image through the system of mirrors.

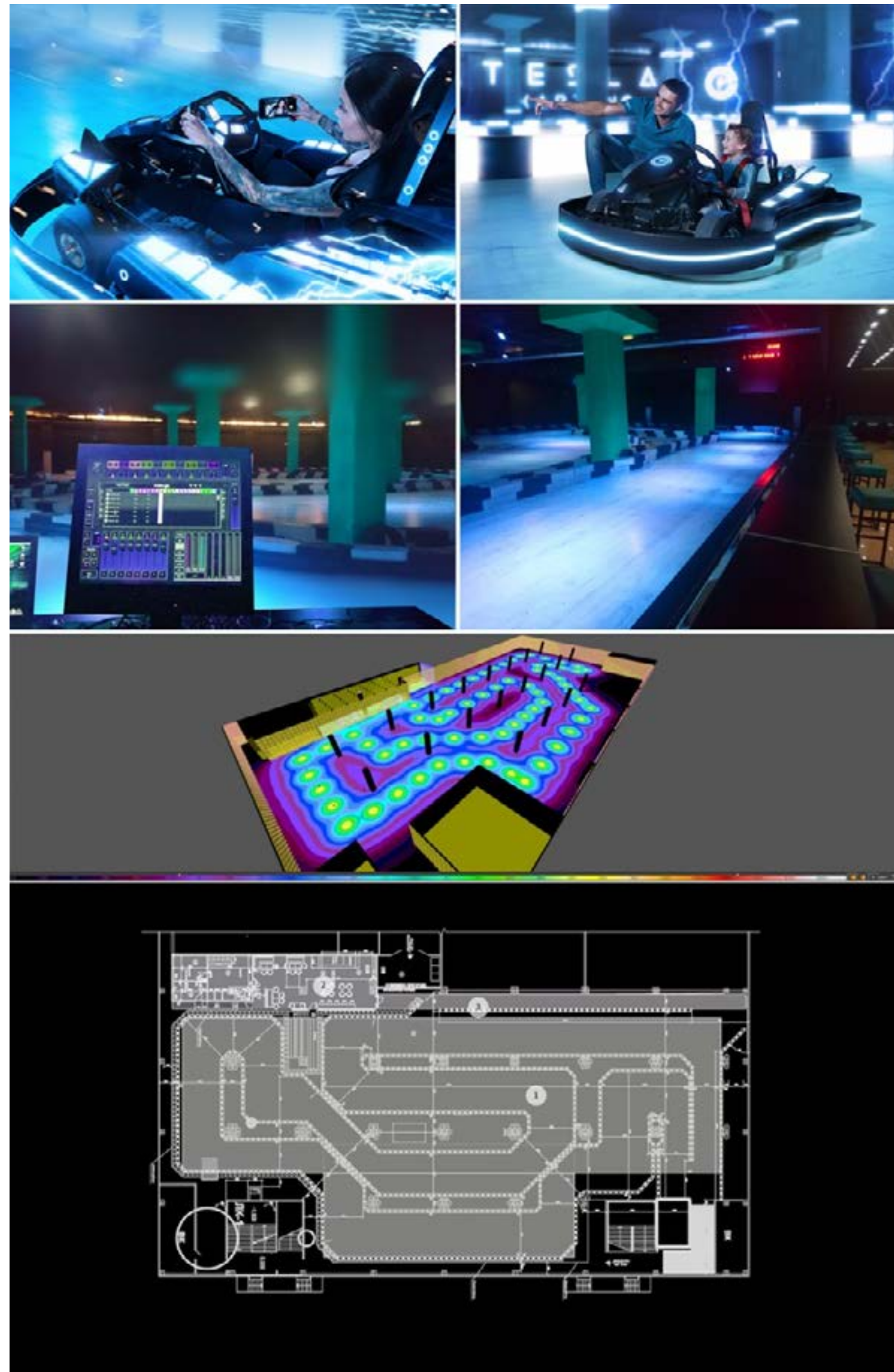
Multimedia Spaces



EDUCATIONAL ENVIRONMENTS FOR CHILDREN

Author: Ilya Smilga

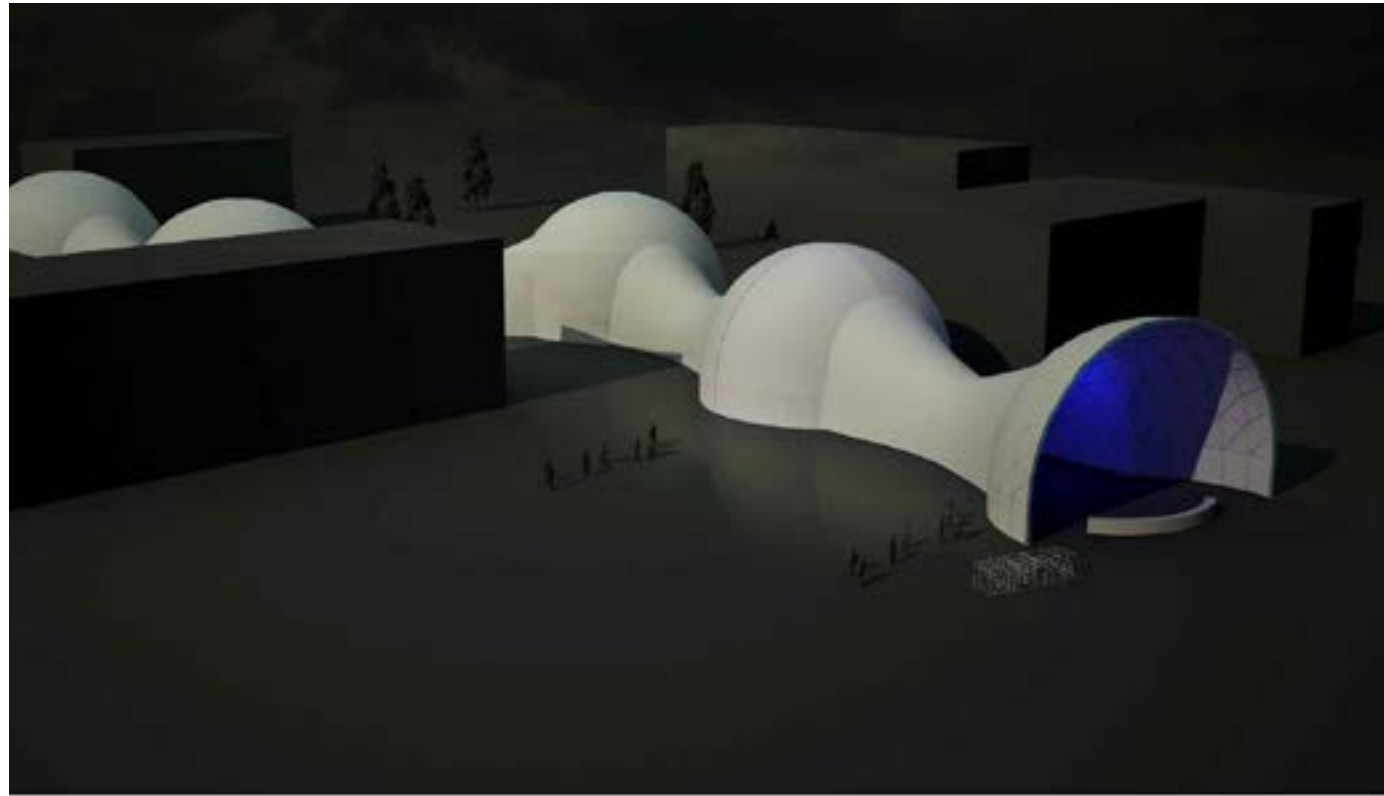
This project is a set of installations that aims to create learning and intellectual spaces for children of all ages. Visual environments are created with the help of advanced media technologies. The project was developed for St. Petersburg Hermitage Museum.



ELECTRIC KARTING TESLA

Author: Ilya Smilga

Karting Tesla is the first project of electric karting in Russia created by Ilya Rashkin and Aleksandr Kozhin. In addition to exclusive Tesla fleet, electric karting has lighting system that programs different scenarios using RGBW lighting fixtures and UV lamps.

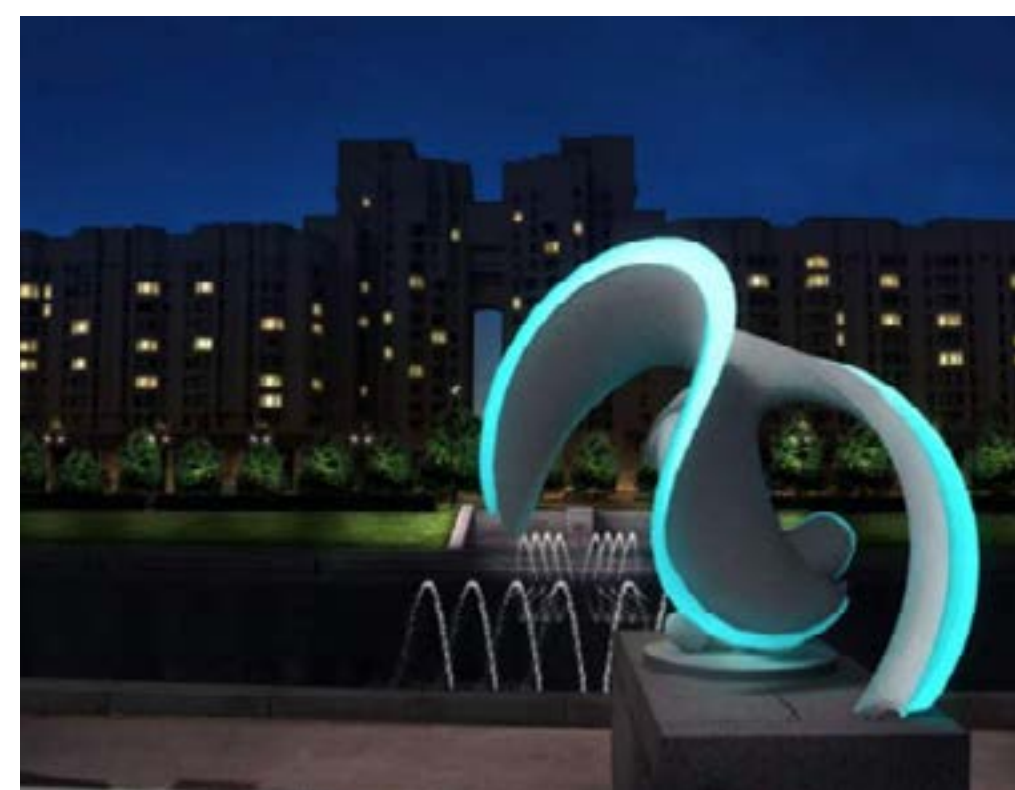
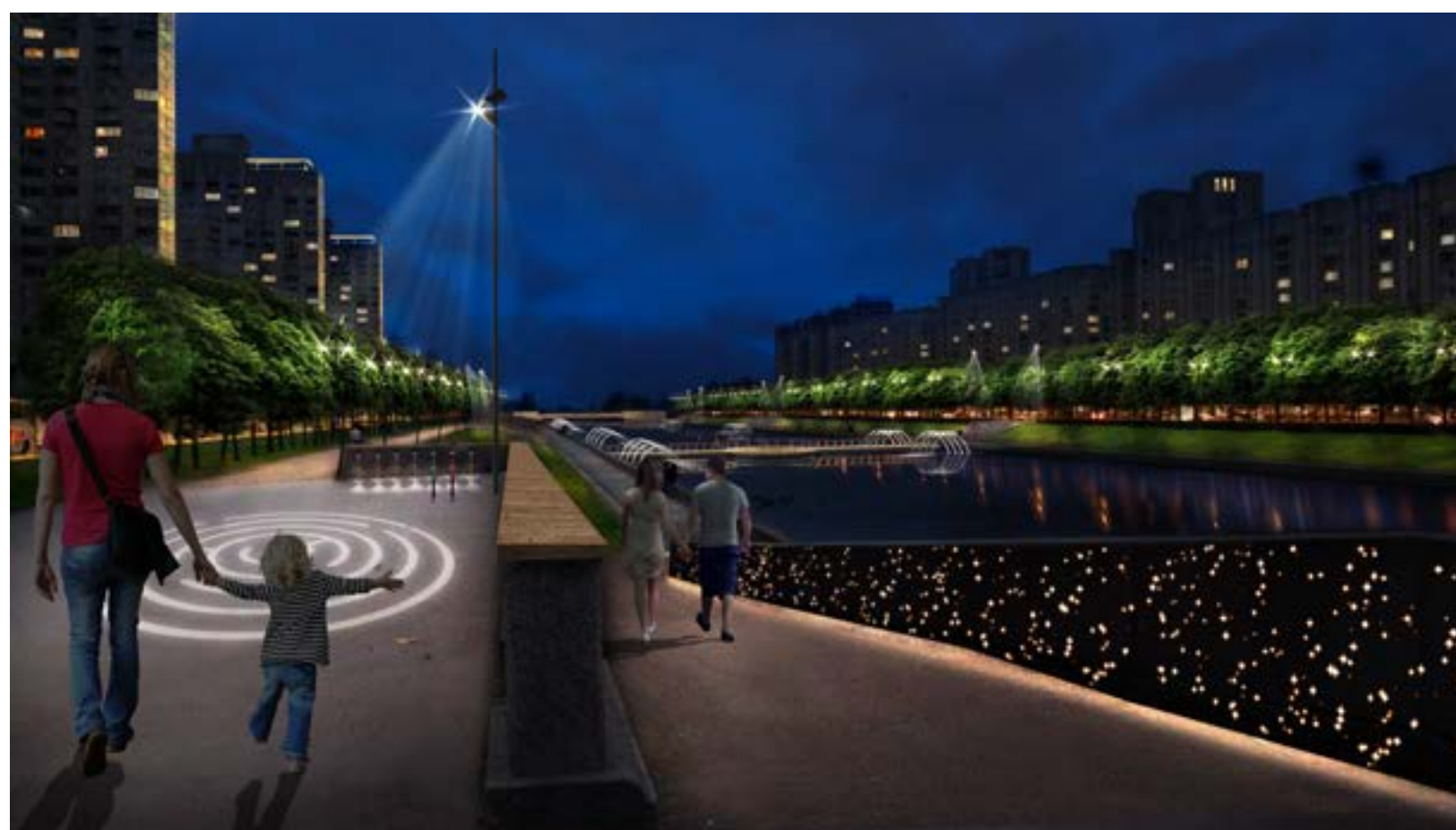


META

Authors: Ilya Smilga, Konstantin Karchmarchik,
Alexander Baburin, Alexey Alferov, Elena Lekus,
Natalia Bystriantseva

The META project was developed for an exposition in China. It is a new type of constructor that allows to create multimedia spaces for a large number of visitors. It consists of domes that vary in size. A video content is projected on the inside of domes and tells us about St. Petersburg's history. This is a so-called spatial film that allows people to gradually immerse into it as they are walking from one dome to another.

Architecture

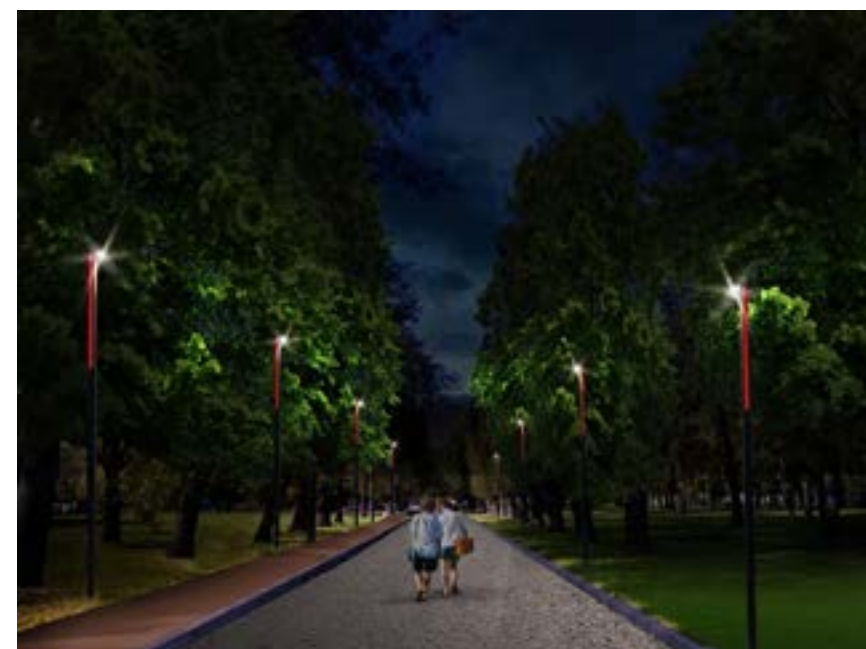


NOVOSMOLENSKAYA EMBANKMENT

Authors: Ksenia Karataeva, Natalia Bystriantseva,
Juliya Lyubakova, Ilya Smilga

This project represents a comprehensive lighting solution for Novosmolenskaya embankment, St. Petersburg.

The main aim is to integrate new technologies such as Li-Fi, light ID and media technology into urban environment. Street interactive lighting installations are developed in cooperation with media artist Taras Mashtalir. This project was carried out at the request of the St. Petersburg Committee for City Planning & Architecture and supported by the state unitary enterprise 'Lensvet'.



STUDENT PROJECT YOUTH THEATER

Author: Juliya Lyubakova

The main idea is to functionally organise a park zone near the Youth Theater building and form an identity of this historical place in order to create a space for the main audience of the Theater — children and teenagers.

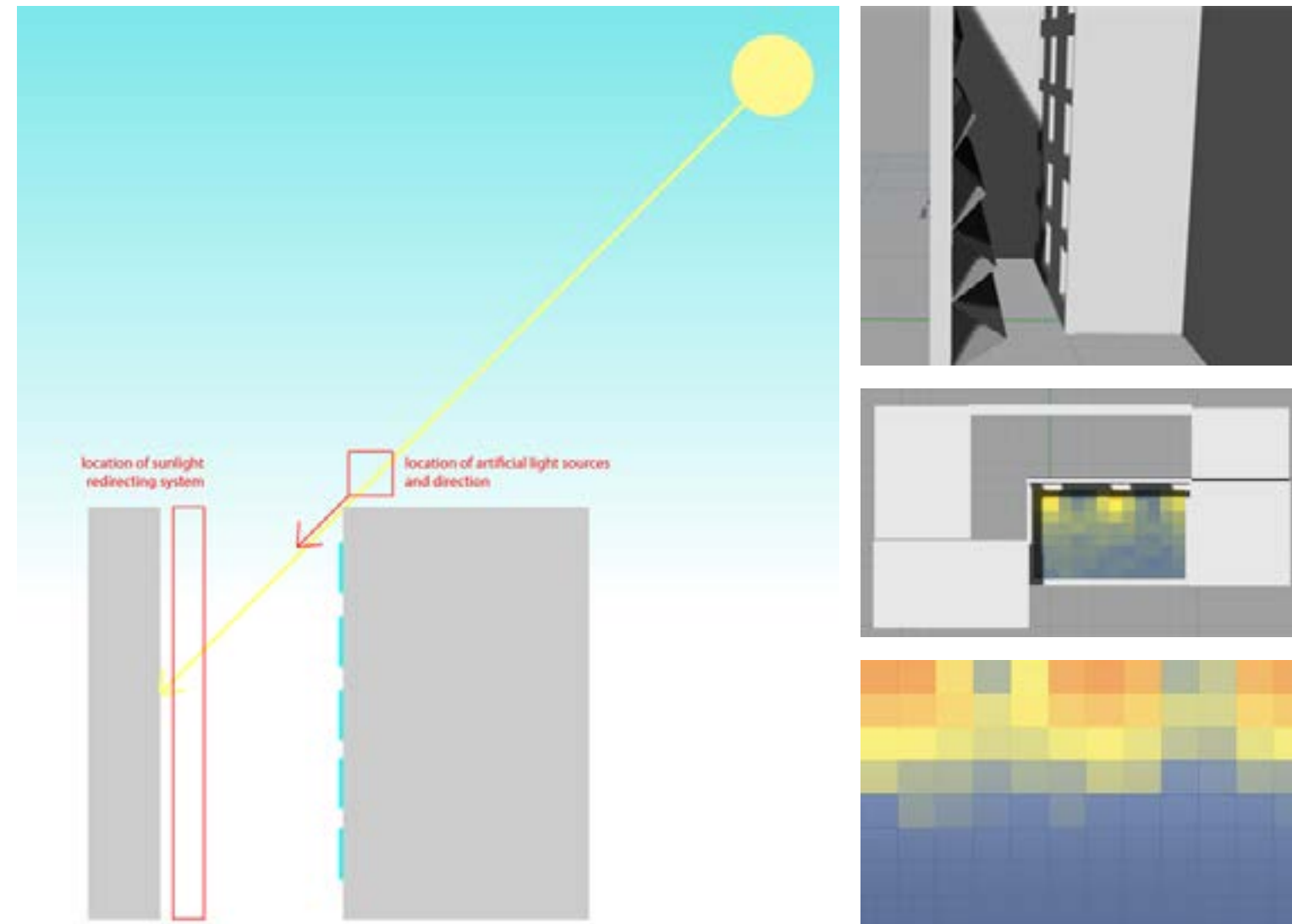
A comprehensive pre-project analysis of an urban environment fragment was carried out and helped us to identify main challenges of the project.

The design concept combined main principles of constructivism and minimalism to create functional lighting for the park zone and facade of the Theater's building. Moreover, CLD's specialists designed architectural objects such as children's playgrounds and areas for socialisation.

STUDENT PROJECT EXTERIOR HIBRID LIGHTING

Author: Dmitrii Chukhin

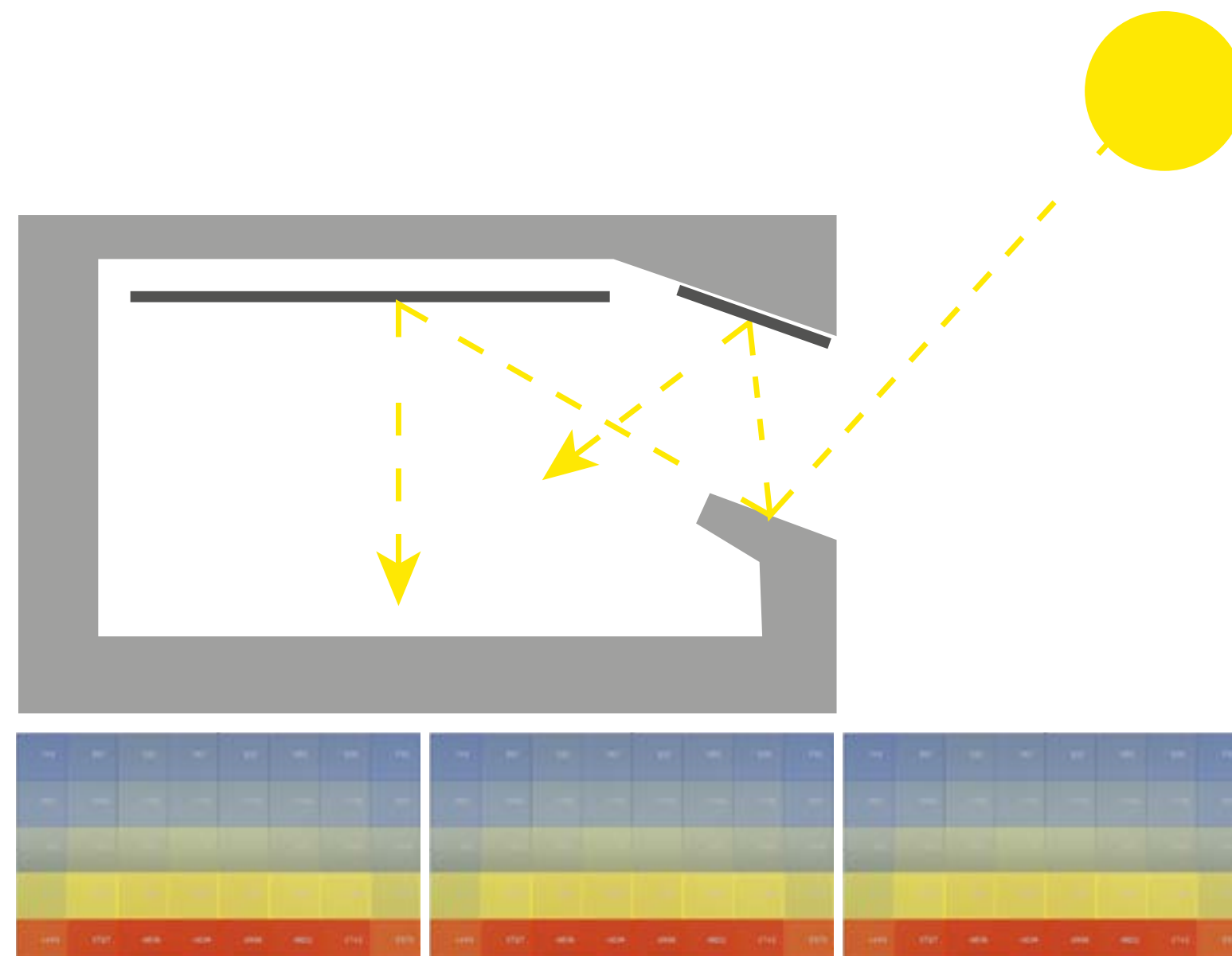
Student project aims to achieve maximum redirection of natural light into dark areas of cities' courtyards. Sources of artificial light are located on top of buildings and stimulate distribution of sunlight. Structural components of this lighting system include reflective panels that will be located on courtyard's walls, LED light sources located on the roof, and rotating mechanisms that change panels' orientation.



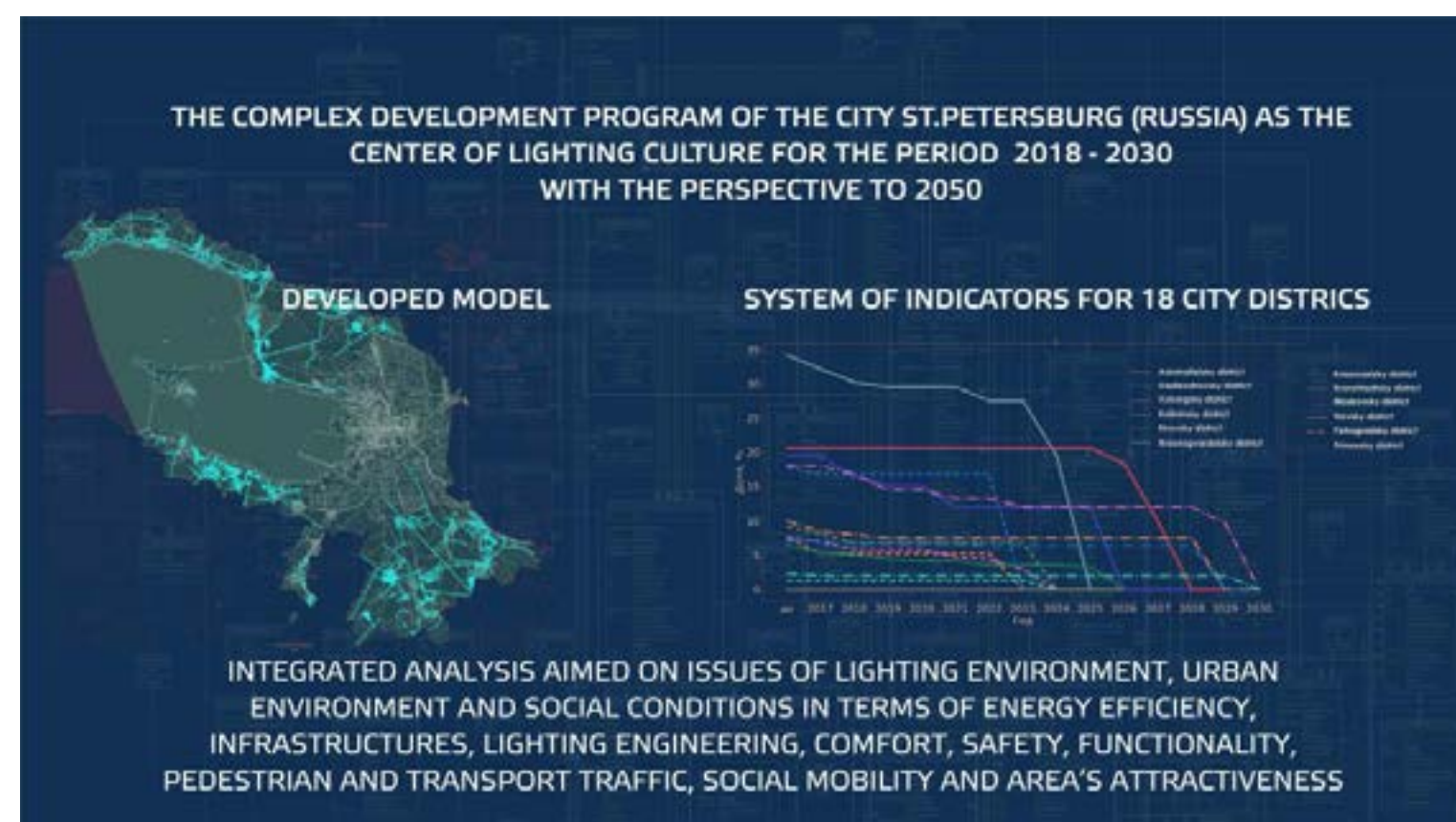
STUDENT PROJECT INTERIOR HIBRID LIGHTING

Author: Valeriia Lukinskaya

This project is a hybrid parametric lighting system that aims to maximise the use of daylight and, when it gets darker, to imitate natural light in way that is comfortable for visual perception. For example, this model can be implemented in school buildings and will increase children's productivity. Both projects will have positive impact on human health and well-being.



Urban Environment



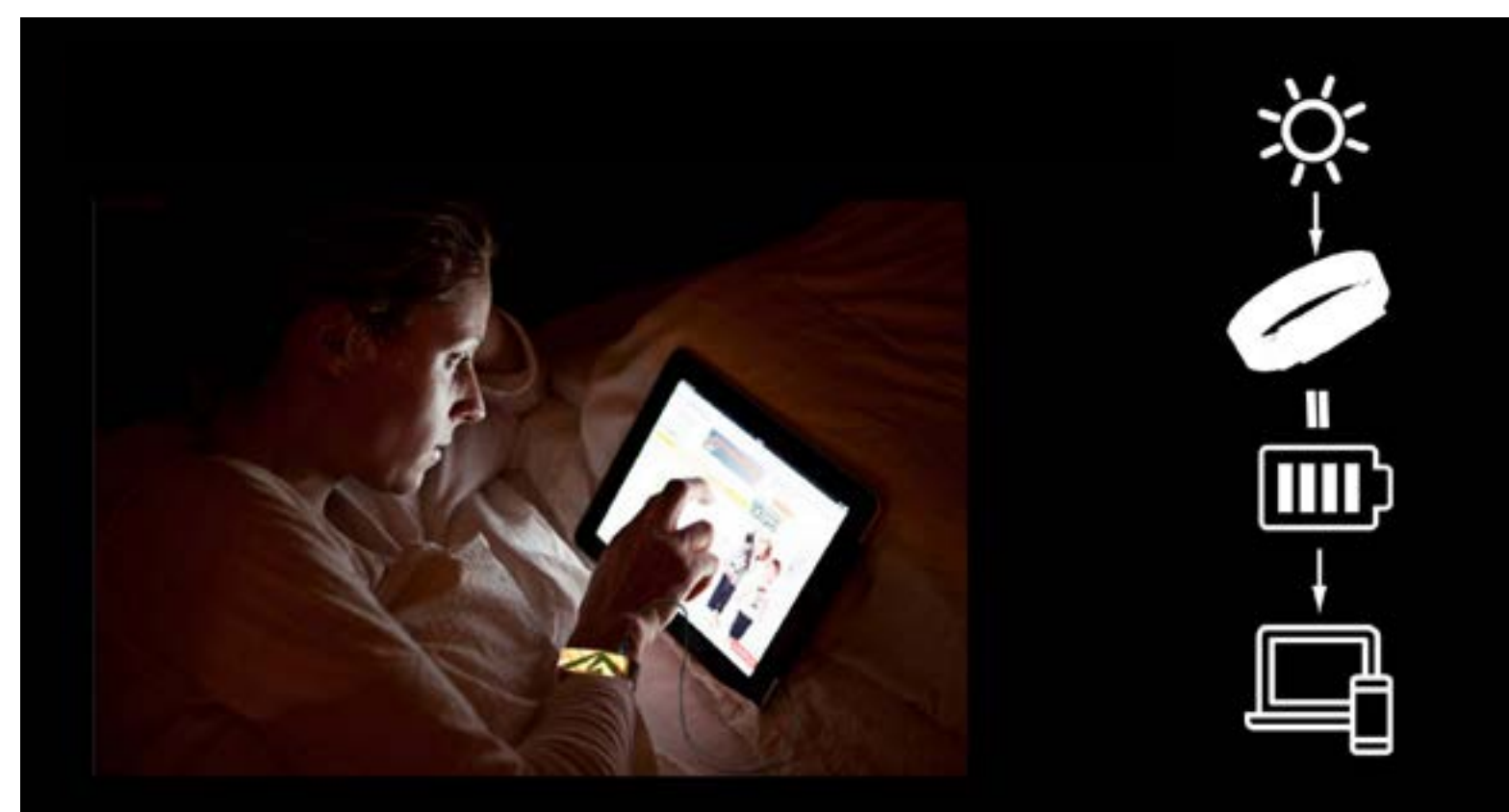
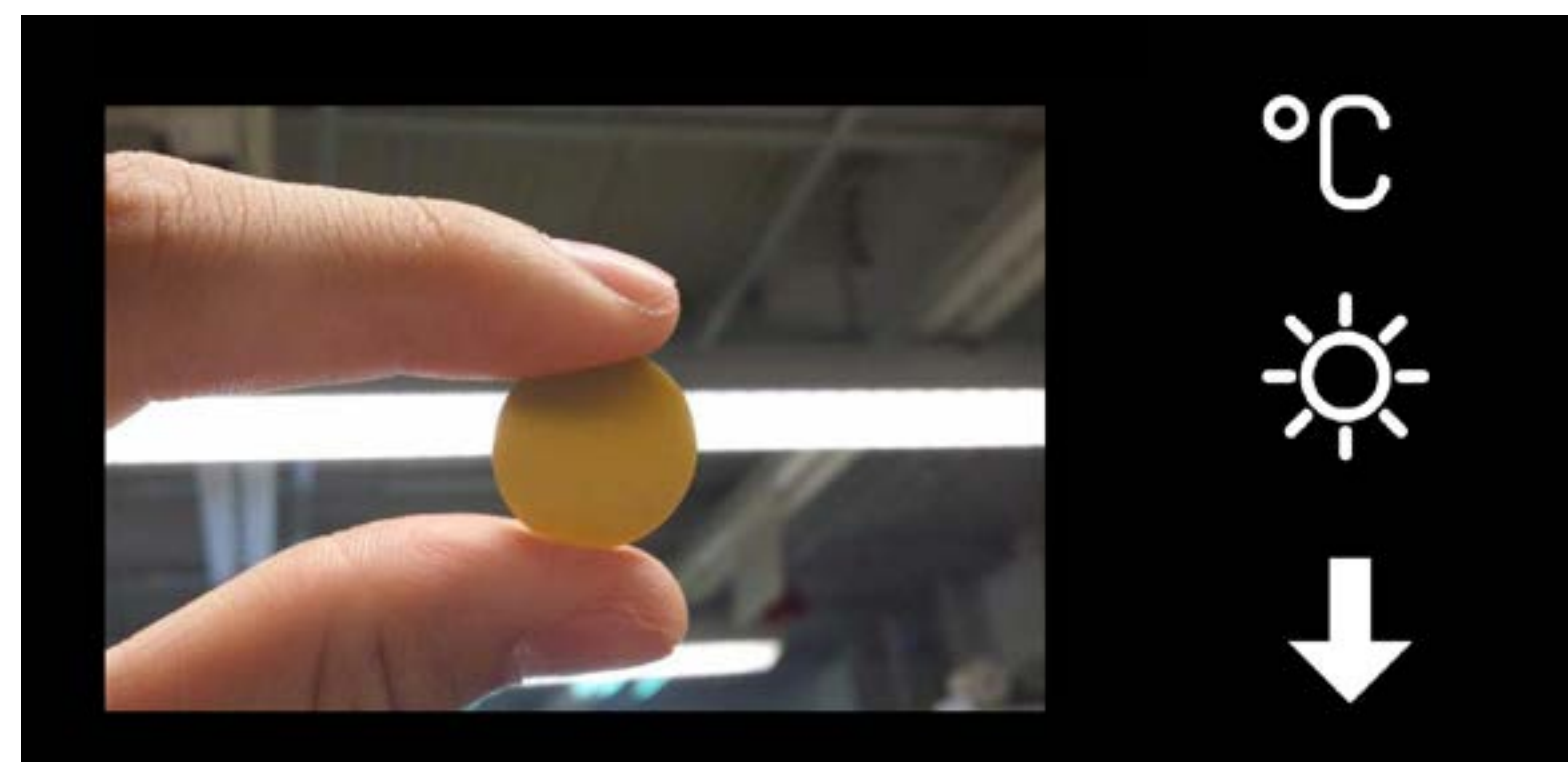
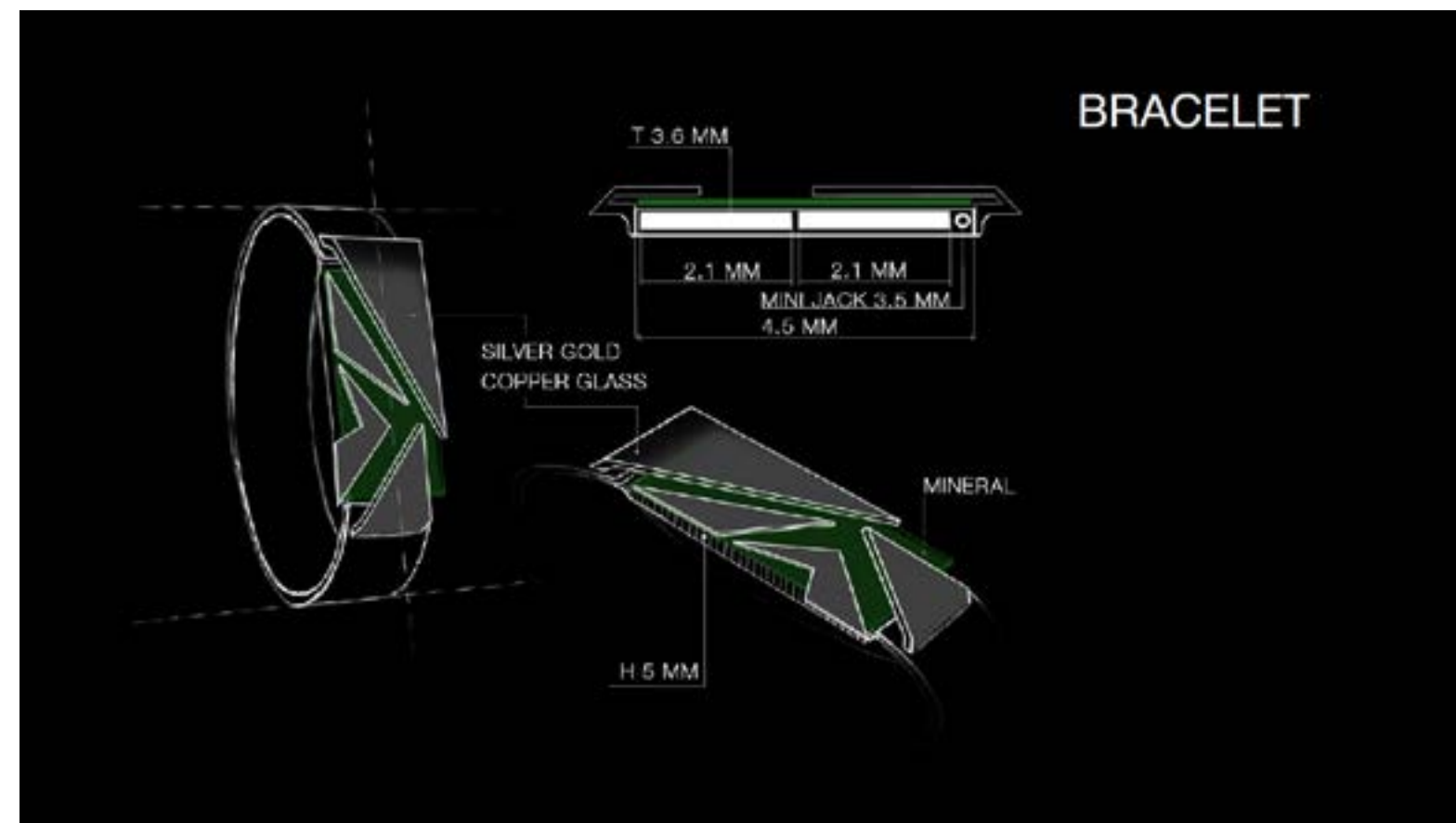
BIG DATA ANALYTICS SOFTWARE FOR URBAN LIGHTING

Head of Project: Natalia Bystriantseva

The city of St. Petersburg is launching a flagship Research & Innovation project that aims to develop new urban lighting environment for the period from 2018 – 2030 up to 2050. This is the first state project that combines Big Data solutions, conceptual analysis and foresight methods to design a sustainable lighting environment that could boost city's energy efficiency and significantly improve quality of life for its residents.

The main goal is to create a software package quality control to achieve city's long-term goals. Principal objective of such integrated analysis is to identify key issues of lighting and urban environment as well as social issues related to architecture, infrastructure, energy efficiency, lighting engineering, comfort, safety, functionality, transport, traffic flows, social mobility, city's liveability and attractiveness. This project was carried out at the request of the state unitary enterprise 'Lensvet'.

Smart Fashion



SMART ACCESSORIES

Authors: Dr. Yang Bai, Valeriia Molodovskaya

The winner of the LIT DESIGN AWARDS 2017

This is a design concept for energy-efficient smart accessories. It is based on the KBNNO material that was created by Dr. Yang Bai, a scientist from the University of Oulu (Finland). This material is unique because of its small size and its ability to generate electricity directly from light, heat, and mechanical energy.

At the moment, there are four types of accessories such as a ring, bracelet, pendant and footwear. All of them can absorb light and use heat generated by the human body. Moreover, the footwear can absorb energy caused by pressure generated when a person is running or walking, and convert it into electric energy.



CHAMELEON JACKET

Author: Roman Antonov

Chameleon jacket changes its colour when a person wearing it touches something. White diodes are taped on jacket's sleeves and put light on an object. Then sensors detect a colour of this reflected light. They send a signal to microchip that manages light regimes of diode tapes.

Moreover, one of jacket's layers consists of thinsulate — modern heat-keeping material that also diffuses diodes' light and allows for an even distribution of light. This system detects objects that are 3–4 cm away from sleeves so you don't need to actually touch the object to get its colour.

Partners

VIA VERLAG

RULD

St. Petersburg State Unitary Enterprise
LENSVET

Partner Universities

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