

innovation Space Intelligent Lighting.

Eindrapportage TU/e Education Fund 2018

11 januari 2019 – Elke den Ouden & Jolan Hulscher

Content

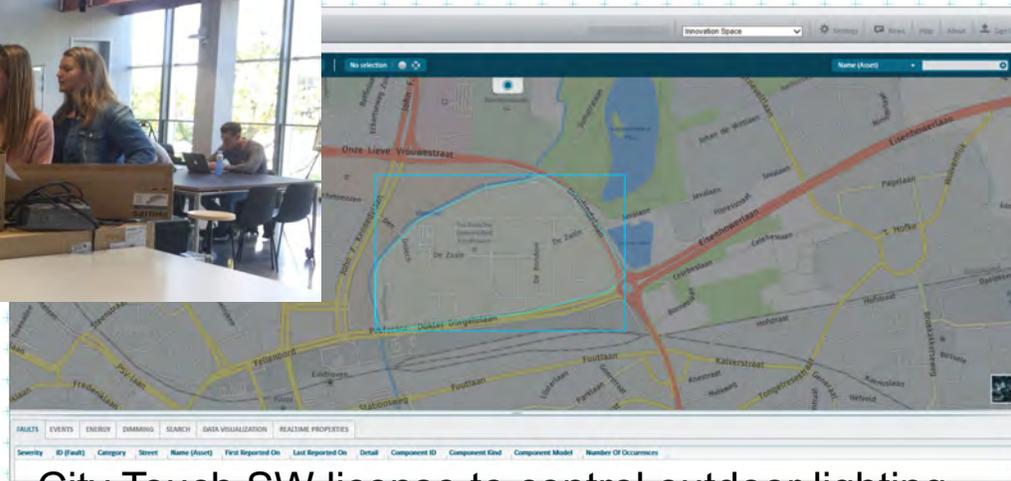
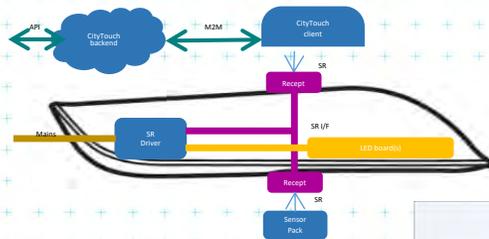
- Setting up a light-related working environment in TU/e innovation Space
 - Equipment for students to use in projects
 - Connecting companies to courses in BSc and MSc programs
- Pilot of a multidisciplinary student working group
 - Execution of pilot
 - Key learnings
 - Deriving process for succesful projects
- Dissemination of project products
 - Presentations at various events
 - Team Ignite @ GLOW 2018
 - Lighting installation to attract attention at new venue
- Summary of key achievements

Setting up a light-related working environment in TU/e innovation Space

- Equipment for students to use in projects
- Connecting companies to courses in BSc and MSc programs to TU/e innovation Space

Equipment for use in projects

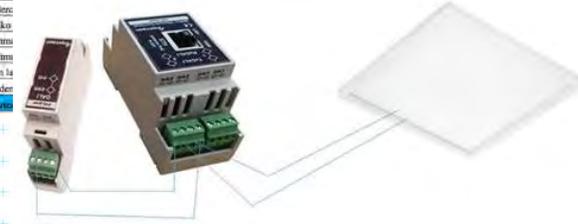
Sensor ready luminaires for outdoor use



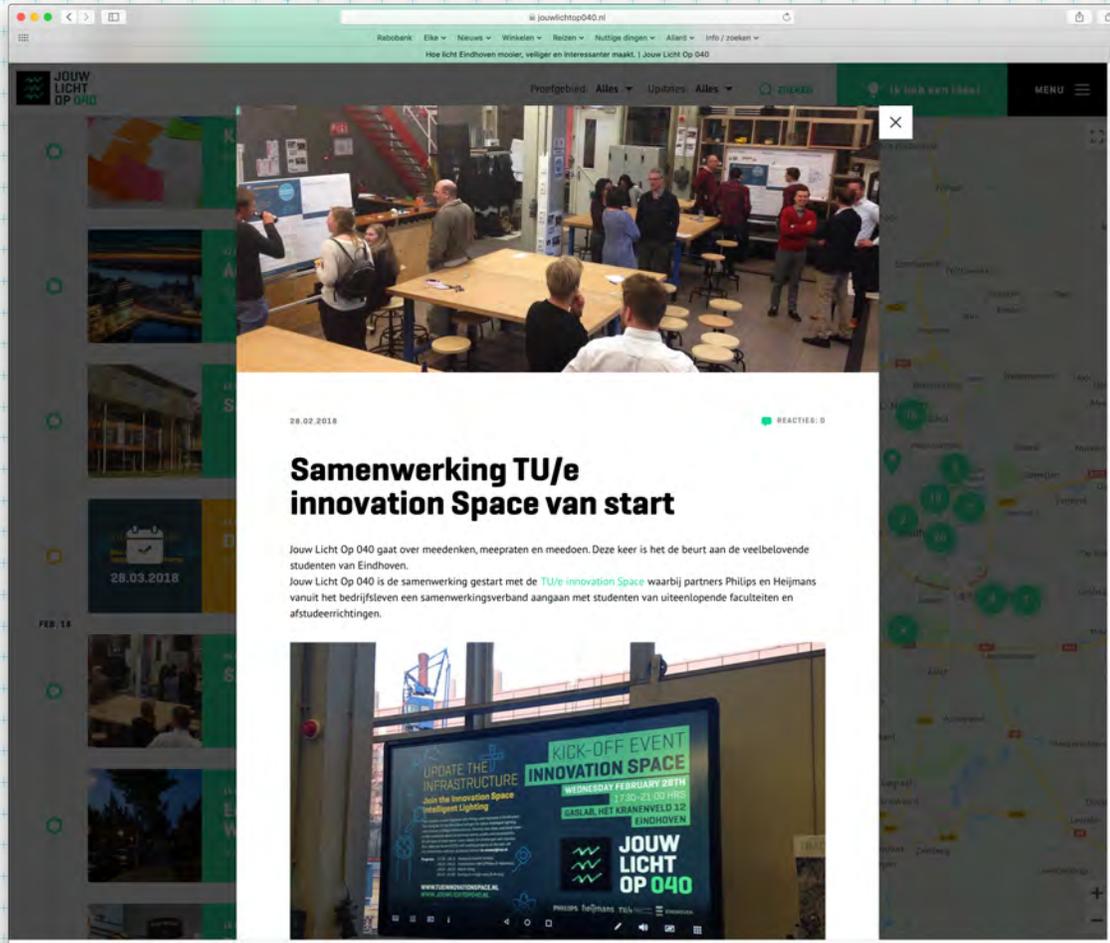
City Touch SW license to control outdoor lighting

Luminaires and control equipment for indoor use

6	BCP470 36xLED-HB-RGB 21 WH DMX	ColorBlast PC (Gen 2), White, 23DEG
6	BCP470 36xLED-HB-RGB 10 BK DMX	ColorBlast PC (Gen 2), Black, 10DEG
4	ColorBlast BCP472 10BK	ColorBlast PC (Gen 4), Black, 10DEG
1	Controlcase ALL-STOCK complete	Controlcase, ColorBlast
2	Schuko Power Extension Cable 5m	Powercable, 5m
16	Hirschman cable 5m	Jumper cable, Hirschman-Hirschman 5m
4	ALL Hirschman Junction Box	Junction box Hirschman 1-4
3	Foam Layers Blast	Foam layers Blast
2	Wooden crate normal height	Accessories crate normal height
1	1 Lightcase Blue 125x60x90mm (LxWxH)	159.8 Kg
20	BCP494 76xLED-LP-RGB	iColor Accent PC (Gen 2), 4FT
1	Controlcase ALL-STOCK complete for Accent	Controlcase, ColorBlast, Accent
10	iColor accent jumper cable 1.5m	Jumper cable, iColor accent 1.5m
20	iColor accent jumper cable 30 cm	Jumper cable, iColor accent 30 cm
1	Schuko Power Extension Cable 5m	Powercable, 5m
4	Foam layers Accent	Foam layers Accent
2	Wooden crate normal height	Accessories crate normal height
1	1 Lightcase Blue 125x60x90mm (LxWxH)	149.8 Kg
17	BGS559 10x60 RGBW 1.609	Colorzone MX4 RGBW, 10DEG, 2FT
1	Controlcase ALL-STOCK complete	Controlcase, ColorBlast
2	DataEnabler Pro	DataEnabler Pro
16	ZCS459 CSHP.M.F.-BK (jumper 40 cm)	Jumper cable, QLX 40cm
22	ZCS459 ConectorBK Jumper 10 cm	Jumper cable, QLX 10cm
4	QLX-Hirschman Jumper	Jumper cable, QLX-Hirschman 10cm
4	Hirschman-QLX Jumper	Jumper cable, Hirschman-QLX 10cm
2	Lesabrite	
2	Schuko	
3	Hirschman	
2	Hirschman	
4	Foam 14	
1	Wooden	
1	1 Lightcase	



Connecting external parties to courses in BSc and MSc programs



See for more information the website: www.jouwlichtop040.nl



Pilot of a multidisciplinary student working group using the space

- Execution of pilot
- Key learnings
- Deriving process for succesful projects

Execution of pilot

- Projects connected to Jouw Licht op 040:
 - BSc USE Secret Life of Light (4 teams)
 - BSc USE Entrepreneurship in Action (6 teams)



CHALLENGE 'DE RING' EINDHOVEN

29.09.2018

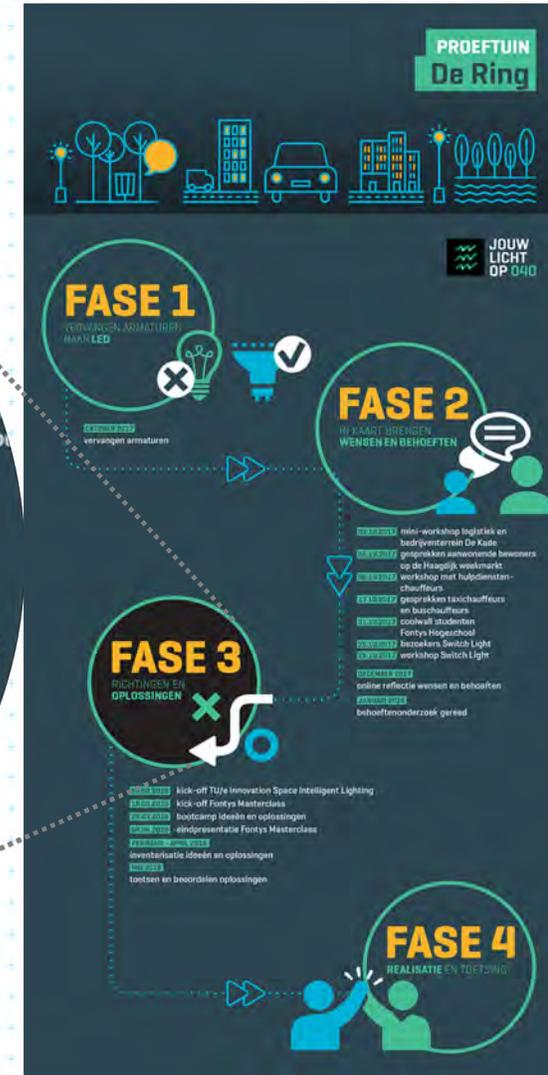
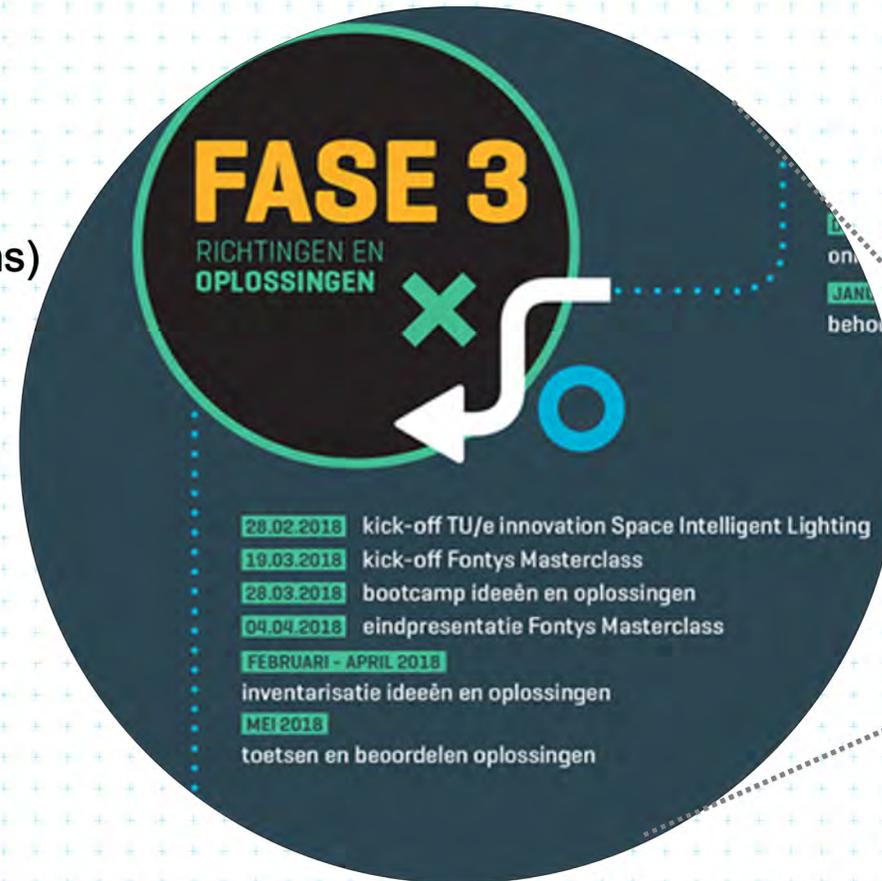
Winnende oplossing voor de Ring is bekend

Bijna 1000 Eindhovenaren hebben gehoor gegeven aan onze vraag om hun mening te geven in de enquête waar we zeven oplossingen voor trace De Ring presenteerden. Jouw Licht Op 040 is erg blij met de betrokkenheid van iedereen die tijd hiervoor heeft genomen!

Deze resultaten, samen met de beoordeling van alle oplossingen door een vakkundig team, bestaande uit vertegenwoordigers van de Gemeente Eindhoven, Heijmans, Signify en TU/e, hebben geleid tot de volgende voorlopige uitslag:

1. Inzicht verlicht
2. Smart Traffic
3. LEDConnect ← **Course: Entrepreneurship in Action**
4. Sepe my Ring
5. Bikescout
6. Pannuten
7. Licht op groen ← **Course: Secret Life of Light**





- Two teams were part of the final 7 solutions for the Ring Road

Key learnings

Course preparation

Planning rooms

Since there are not that many different rooms in innovation Space, it's essential to discuss the planning of the rooms timely (six to eight weeks before the course starts). My recommendation: Go through your entire course week by week with the education coordinator. Explain what is needed per contact hour.

Final presentation event

In Q4 2018, we held a large final presentation event where eight groups of two different courses presented their findings toward a large number of industrial partners. Although the students were very nervous to do this, they were super excited afterwards. They loved the fact that it was a real life case and people cared about what they were doing. They also liked that they could speak to the people from industry afterwards and share ideas on how to continue with their idea. Therefore, my recommendation: always try to host a kick-off event where a number of industrial partners is present. This makes students much more motivated to make something out of their project. Host a large final event where students can pitch their ideas to industrial partners. This is essential for follow-up after the course.

Materials and equipment

In Q1 2019, the students needed outdoor lighting prototyping material. This was not in property of the university. So what to do? Luckily, our industrial partner had four flight cases of prototyping material ready to be used. Problem: they returned from Poland the day before the students needed it. Also, there was no transport from the warehouse to the university. In the end, I borrowed a car and trailer from the URE team to pick up 450 kilo of prototyping material. It was ready to be used 5 minutes before the course started. My recommendation: always ask the industrial partner if they have prototyping material. But also always ask if they can fix the transport from their warehouse to the university.

Case selection

Alignment case with course

In Q4 2018, we held several cases on outdoor lighting. One of the ideas we wanted to continue in two other courses in Q1 2019. This was very tricky, since I had to mediate between the students, teachers and industry. All parties had to be aligned. The students feel that somebody else is going to run with their idea, which feels like steeling. The teacher had to be convinced that the continuation of this idea is better than just a random case. The idea of the students was part of a larger project of industry (Jouw Licht op 040). Therefore, the industry project had its own timeline as well. It was tricky how to fit this student project in the larger one. However, in the end, we had a very nice project and more than 10 persons from industry present at the final presentations. My recommendation: only put time in the continuation of the idea if the students are really enthusiastic in doing so.

Create contact moments (coaching)

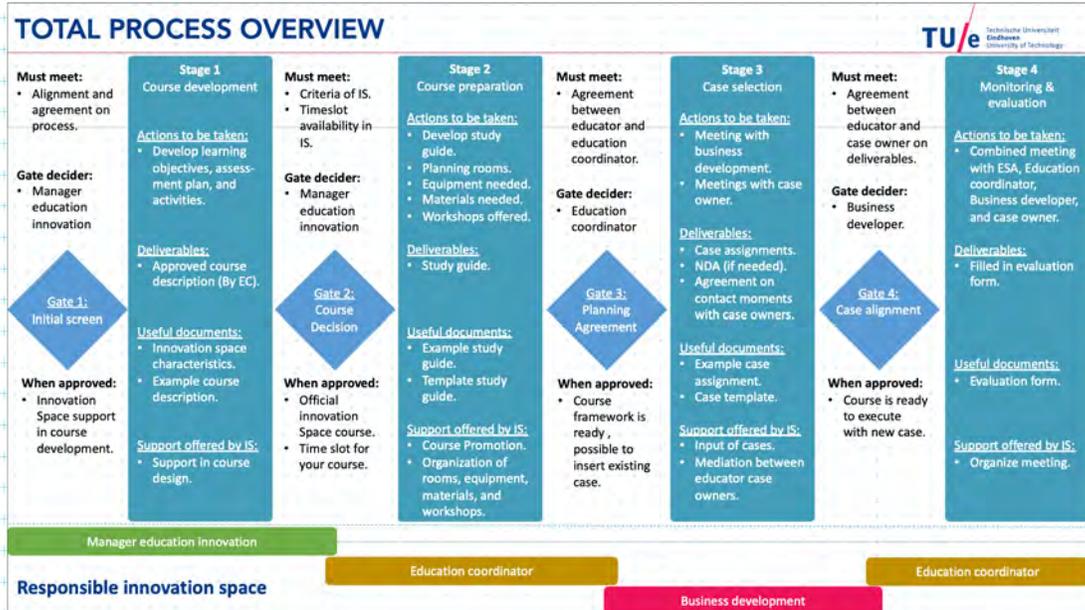
Here, it's very important to know what kind of coaching is needed. In Q1 we needed coaching for a course. I thought it was general coaching, so I made sure the innovation manager would be present. However, the students needed expert knowledge on light design, they needed a light designer. Complete different field of expertise. In the end, I made sure that a light designer would coach for 5 sessions. My recommendation: Explain in detail what kind of coaching is needed, general case coaching or specific knowledge on a particular topic.

Don't underestimate the slowness of industrial partners

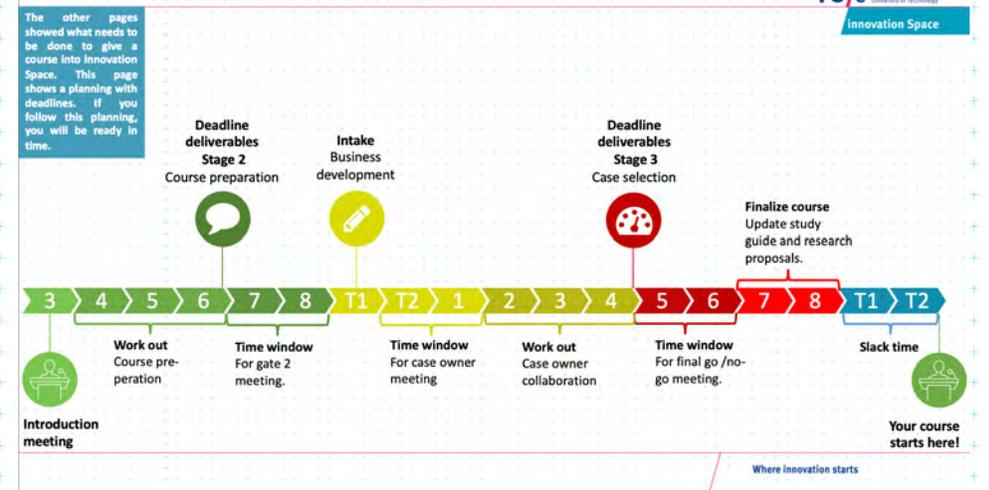
You have to understand that doing a case at innovation Space is not the primary business target for case owners. The result of this, is that case owners tend to 'forget' that they agreed on the case. I performed a lot of calls and mails to make sure everybody was aligned. Therefore my recommendation: get the agreements on black and white and sign it. This creates more ownership at case owners.

Deriving process for successful projects

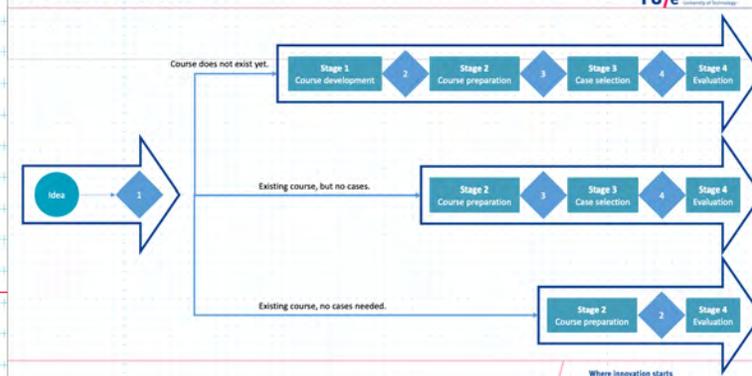
Using the learnings to define a process for innovation in education – for general use



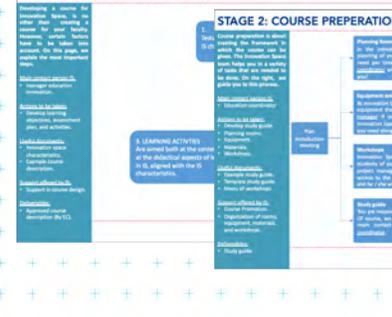
TOTAL PROCESS OVERVIEW - TIMELINE



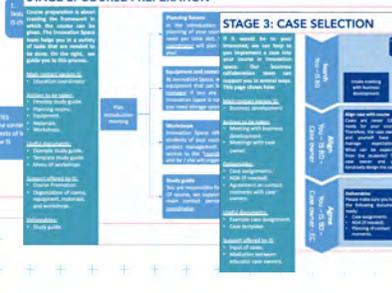
OPTIONAL ROUTES



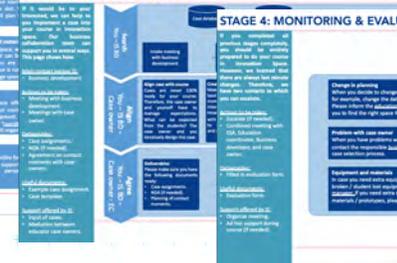
STAGE 1: COURSE DEVELOPMENT



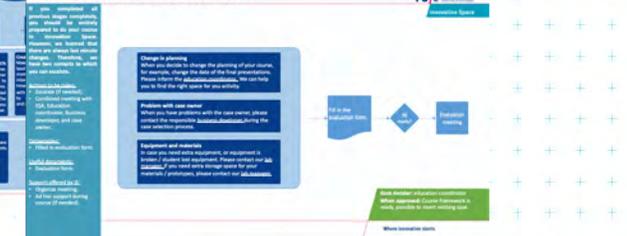
STAGE 2: COURSE PREPARATION



STAGE 3: CASE SELECTION



STAGE 4: MONITORING & EVALUATION



Where innovation starts

Dissemination of project products

- Presentations at various events
- Team Ignite @ GLOW 2018
- Lighting installation to attract attention at new venue

Presentations at various events

ruimte en licht Vakblad voor licht in de openbare ruimte

KENNIS NETWORK

Licht en Techniek Licht en Organisatie Licht en Functie

5 december 2017 AGENDA

Vakbeurs Ruimte & Licht 2018

Professionals op het gebied van openbare verlichting verzamelen zich op 5 juni in Houten voor de derde editie van de Vakbeurs Ruimte & Licht.



banden aan te halen

Openbare Verlichting Congres Ruimte en Licht

Programma 2018

11:45 - 11:55

Workshop en bijdragen

Elke den Ouden, TU/e en Philip Ross (een (Studio Philip Ross) aan de hand van ILI, 2017 en 2018 zien hoe lichtbuis met menschenprijzen wordt versierd. Ook interessant als u niet mee gaat naar GLOW ...

TU/e Innovation Space Intelligent Lighting

Ruimte en Licht – 15 November 2018

Dr.ir. Elke den Ouden, TU/e Fellow Industrial Engineering & Innovation Sciences

ILI INTELLIGENT LIGHTING INSTITUTE TU/e INNOVATION SPACE

Intelligent Lighting Institute

TU/e

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ILIAD 2018

Book up

Event Details

Date: Tuesday November 13, 2018 from 9:30 AM to 5:00 PM Location: Kantarplein 500 5613 LZ Eindhoven

Running: NatLab (Piazza Futura) Organizer: Intelligent Lighting Institute

Price: Free



11:30 Presentation on contribution to GLOW respectively TU/e Innovation Space dr. P.R. (Philip) Ross, projectleader ILI GLOW respectively dr. P.H. (Elke) den Ouden, TU/e fellow new business development smart lighting & smart cities

The Intelligent Lighting Institute (ILI) organizes the 2018 edition of its annual public outreach event. During this event we highlight recent developments in transdisciplinary research & innovation in smart & technology in light & intelligent lighting and its application in for instance health & well-being.

During the event the audience will also be able to get better informed about research, courses, and upcoming research & innovation projects carried out by researchers related to ILI by means of a series of poster presentations. The ILIAD is organized in cooperation with the Center for Systems and Technology.

The InnoSpace Intelligent Lighting Project

Author: Elke den Ouden

On September 15, TU/e Innovation Space was agreed with great interest on the GLOW building. It will give the combined development of TU/e's built-in education. In cooperation with researchers and industry, students will work face on societal challenges. ILI students are going to participate in the InnoSpace Intelligent Lighting Project.

TU/e Innovation Space

At a strategic level, TU/e encourages interdisciplinary collaboration in education by the set-up of the new TU/e Innovation Space. TU/e Innovation Space is a community that facilitates and supports interdisciplinary fields on education, engineering design and entrepreneurship. It offers a place where students learn to deal with complex technical and societal challenges, oriented towards projects with cross-sector, disruptive and other innovative outcomes. It provides a space where students that identify and offer solutions to societal, are supported to translate their ideas. Building on the strong scientific collaboration that TU/e has with industry, TU/e Innovation Space helps in developing an educational experience to address the best engineers for this industry, the "Engineers for the Future". Finally TU/e Innovation Space strives to contribute to society by providing

an better equipped to the demands of the job market and to serve as a viable and changing education.

TU/e Innovation Space offers students the chance to learn about societal challenges. It offers a major space where students can connect and the innovation processes with their support and expertise. Results can be demonstrated in an exhibition space and there is a real-time view of the results and outcomes. Beyond a physical space, TU/e Innovation Space provides a platform that connects researchers, staff and industry, creating a vibrant community.

Cooperating with ILI

ILI believes that public initiatives can create synergy at the time. TU/e Innovation Space's Intelligent Lighting Institute takes with the support of an industrial partner within the Intelligent Lighting Project. The research program of ILI is a collaboration with the Philips Lighting Lighting program provides a similar opportunity to create synergy between researchers and industry. The research program in "Innovation Space Intelligent Lighting" will create synergy between researchers and industry by working together on a particular project. The lighting course in particular is designed to integrate technology of innovation, design, communication, business model innovation, and design to create solutions. The Intelligent Lighting Institute is a joint effort between the university, through this project, TU/e can raise research that are ready for working in such environments.



Creating a continuous innovation process

The current course in the theoretical progress and GLOW learning times to address the interdisciplinary projects, but the progress can be increased through collaboration with TU/e Innovation Space and external researchers of the academic world provided by the Intelligent Lighting. This creates a win-win situation for the student's education and progress in an interdisciplinary professional working environment, the university (during their education) towards the actual needs of the innovation industry and the industry (during their career) before graduation. In collaboration with TU/e Innovation Space, it becomes clear that this active collaboration with industry and the interdisciplinary approach to be well suited to a challenging and inspiring task.

The first course/competition will eligible for every student from Philips Lighting and students and possibly the best of the Eindhoven ring field day. Students can do the project next to their study, but we are not responsible for this project in fully meaning that they will work on their projects in a course "The Social Life of Light - GLOW Project" course of Innovation Hub will be a pilot case for this new concept. Later, we can also connect GLOW and GLOW learning from the interdisciplinary Intelligent Lighting Project program. For instance, ICS, Data Science, and Design Mobility courses have tremendous potential as well as the use of real-time lighting systems in the next five years, and to be used illumination.

Team Ignite @ GLOW 2018



10 LOOP



LOCATIE
KAREL VERMEERENPLANTSOEN

Dit is Loop, een interactieve lichtinstallatie gemaakt door Team IGNITE.

Tijdens GLOW 2018 wordt deze installatie, die een hoogte heeft van vier meter, door de bezoekers bediend. Met diverse interactiemodules kan de bezoeker door diverse handelingen uit te voeren het licht van de installatie regelen.

Tijdens deze editie van het festival worden alle gegevens van de modules en het publiek verzameld voor gebruik in toekomstige installaties. De beste modules worden doorontwikkeld en gaan deel uitmaken van Hypar, een grotere installatie die het team op GLOW 2019 zal presenteren.

Dit project wordt mede mogelijk gemaakt door:

TU/e



Lighting installation to attract attention at new venue



innovation
Space *Grand Opening*
invitation

Thursday November 15th at 15:00

We are pleased to invite you to the
official launch of TU/e innovation
Space in the Matrix building.

TU/e

iINNOVATION
SPACE

Summary of key achievements

Projects done for:

- **The secret life of light (Q4 and Q1)**
 - Joww licht op 040 – Tracé de Ring
 - Atlas
- **Entrepreneurship in Action (Q4 and Q1)**
 - Joww licht op 040 – Tracé de Ring
- **The liberation of Light (Q1)**
 - Joww licht op 040 – Tracé de Ring
 - Atlas
- **Light and Experience (Q2)**
 - Joww licht op 040 – Eisenhowerlaan
 - Social lighting
- **Innovation Space BEP (Q3)**
 - Joww licht op 040 – Sorama
- **Innovation Space project (Q3)**
 - Atlas

Successes

- **Final event for The secret life of light Entrepreneurship in Action:** In Q4 and Q1 we held shared final presentations to increase the community feeling for innovation Space intelligent lighting.
- **Start-ups:** Out of the project that were done, two startups called LED connect and Licht op Groen emerged.
- **Continuous innovation:** For the first time ever, we managed to continue a project from the secret life of light (Q4) into two other courses. This was in the Liberation of Light (Q1) and Entrepreneurship in action (Q1).
- **Process overview:** we managed to create a clear process for professors and ourselves to implement courses in innovation Space.
- **Materials:** We purchased both indoor and outdoor prototyping materials that students can use this year.