

# INNOVATION SPACE – INTELLIGENT LIGHTING

## *Advancing Innovation in Lighting through Education*

### 1. PROJECT TITLE AND APPLICANTS

The proposed project “Innovation Space – Intelligent Lighting” is being submitted with the support of the department IE&IS as well as the Intelligent Lighting Institute (ILI). The project is interdisciplinary by design and involves four faculties and TU/e innovation Space. The groups involved represent all program lines of ILI. The applicants are:

Faculty	Applicant
<b>Industrial Engineering &amp; Innovation Sciences</b>	dr.ir. P.H. (Elke) den Ouden prof.dr.ir. Y.A.W. (Yvonne) de Kort
<b>Industrial Design</b>	prof.dr.ir. J.H. (Berry) Eggen dr.ir. H.A. (Harm) van Essen
<b>Mathematics and Computer Science</b>	prof.dr. J.J. (Johan) Lukkien dr. T. (Tanir) Ozcelebi
<b>Built Environment</b>	prof. Dr.-Ing. habil. A.L.P. (Alexander) Rosemann ir. M.P.J. (Mariëlle) Aarts
<b>TU/e innovation Space</b>	prof.dr.ir. I.M.M.J. (Isabelle) Reymen drs. M. (Marius) Monen E.F.I. (Eva) van Hattum

### 2. BACKGROUND AND JUSTIFICATION OF THE PROJECT

The nature of innovation has changed drastically in the last 150 years. Many technological breakthroughs in science and technology in 19<sup>th</sup> and beginning of the 20<sup>th</sup> century have been accomplished by individuals. Nowadays, multi-disciplinary teams work together on innovations. The field of lighting is exemplary in this respect: with LED and the integration with ICT new applications are possible, far beyond illumination. To educate students in a multidisciplinary way, ILI has set up the Certificate Program ‘Engineering Intelligent Lighting’ and brings in lighting related topics in the Entrepreneurship courses. At strategic level the TU/e encourages interdisciplinary collaboration in education by the set-up of the new TU/e innovation Space. We believe that both initiatives can create synergy in the new TU/e Innovation Space by creating lighting-related labs with the support of an industrial partner within the Lighting Flagship. The research programs of ILI in close collaboration with the Philips Lighting Flagship program provides a unique opportunity to create innovative solutions in multidisciplinary engineering projects. Projects in “Innovations Space – Intelligent Lighting” will encourage students to draw from their creative abilities while being trained on a particular project. The lighting domain is particularly interesting as it integrates technological innovation, application innovation, business model innovation and changes in user behavior. The multi-disciplinary character is a deep-felt challenge in the industry, and through this project we can create talents that are prepared for working in such environments. The current courses in the faculties and USE learning lines do address the multi-disciplinary aspects, but the impact can be increased through collaboration with TU/e Innovation Space and explicit inspiration of the industrial context provided by the Lighting Flagship. This creates a win:win:win situation for the students (education and insight in a multidisciplinary professional working environment), the university (shaping their education towards the true needs of the innovative industry) and the partners (identifying talent before graduation). In discussions with TU/e innovation Space it became clear that this strong collaboration with industry and the multidisciplinary approach of ILI would create an challenging and inspiring track. TU/e innovation Space can benefit from the already existing multidisciplinary approach and provides support and facilities to selected student teams to enable them to bring their ideas to a higher level in an hands-on and entrepreneurial working environment.

This application aims to support the initiative in the first year to ensure processes are properly set-up; the organization is mature and roles are defined; websites, templates, documentation and ways of working are established. In this way the “Innovation Space – Intelligent Lighting” will be a front-runner of setting up a strong industry and multidisciplinary collaboration. After the first year we anticipate the activities are integrated into the regular activities of involved staff.

### 3. OBJECTIVES AND EXPECTED OUTCOMES OF THE PROJECT

Key objectives of this project are:

- Creation of lighting-related working environments in the new TU/e Innovation Space
- Successful pilot of a multidisciplinary student working group using that space
- Dissemination of project products on the ILI website and showcasing them on the ILIAD (ILI's annual outreach event)
- Dissemination of the results to key stakeholders in the 4TU.CEE community

### 4. PROJECT DESIGN AND MANAGEMENT

The project will be managed by a part-time project manager and will be overseen by the applicants who represent the various program lines of the TU/e Intelligent Lighting Institute. In addition, the project partner Philips Lighting will provide inspiring challenges for student teams to work on innovative solutions and provide guidance to enhance the business potential.

The project will consist of the following particular main tasks:

- Setting up Light-related working environments in the TU/e innovation Space to realize high-fidelity prototypes catering to the three strategic areas
  - Light in Public Spaces, e.g. in connection to the urban lighting living labs in the city of Eindhoven as part of the collaboration project 'Jouw Licht op 040' between Philips, Heijmans, Municipality of Eindhoven and TU/e
  - Light in Professional Spaces, e.g. in connection with the STW project Optilight and the TU/e Atlas Living Light Lab
  - Light in Home applications, e.g. in connection to the Philips Hue platform
- Creating a means to define projects with key stakeholders on and outside campus that can be linked to the TU/e course "Entrepreneurship & Action (1ZAUB0)", the certificate program Engineering Intelligent Lighting (consisting of the courses "USE Light & Experience (0HEUA0)", "USE Advancing Light for Human Functioning (0HSUA0)" and "USE Physics of Lighting and Lighting Design (0HK30)", "Project Secret Life of Light (0HAUA0)" and "Liberation of Light Technical Project (0HK40)", as well as BSc and MSc graduation projects in the participating faculties.
- Investigating solutions in ILI Labspaces (at ID, BT and HTI) and ILI Living Light Labs (e.g. Market Hall in Metaforum and city Living Labs related to Jouw Licht op 040)
- Initiating first projects and support their execution
- Holding workshops with the students, supervising staff and collaboration with the industrial partner Philips Lighting to share insights in an open innovation process
- Defining a selection process of excellent projects that will get additional support and possibilities to create high quality prototypes and business cases from TU/e Innovation Space and Philips Lighting
- Documentation of lessons learned, key successes and recommendations for setting up similar multidisciplinary innovation groups in the TU/e innovation Space

### 5. DISSEMINATION AND SUSTAINABILITY OF THE PROJECT

The proposed project will create a general means to allow formulating new student projects not only during but also after the completion of the project. All necessary processes will be tested and put in place such that lighting-related projects can continuously be worked on – all necessary phases (defining a new project, putting together a suitable multidisciplinary project team, running the project and completing the project) can be carried out in parallel with several project ideas. Implementing this approach will create a revolving cycle and dynamic community of participating students and (industrial) experts. The project will be "sustainable by design".