TU/e
iNNOVATION SPACE

Challenge name	*A new type of light: Design self-sustaining lights*
Challenge owner	*Intelligent Lighting Institute (ILI) in collaboration with Signify & Team IGNITE*
	x *Company* ϒ *Research* ϒ *Student team*
	Elke den Ouden (ILI), xxx (Signify), xxx (Team IGNITE)
Brief summary	*Light is a crucial element in the day lives of all people. Whether it be for biological reasons, working conditions, safety, or aesthetic pleasure. Though, light is often needed or desired at places without electricity. For example, in parks, rural areas, but even in areas devastated by natural disasters or in war zones. This provides us with a complex engineering challenge. Can we design energy independent, self-sustaining light? Can we use innovative technologies, such as Luminescent Solar Concentrators, or even inspiration from nature (e.g. bioluminescence), to create light that needs no connection to the electricity grid? What is needed to realize a desirable solution for users, that is technically feasible and economically desirable?*

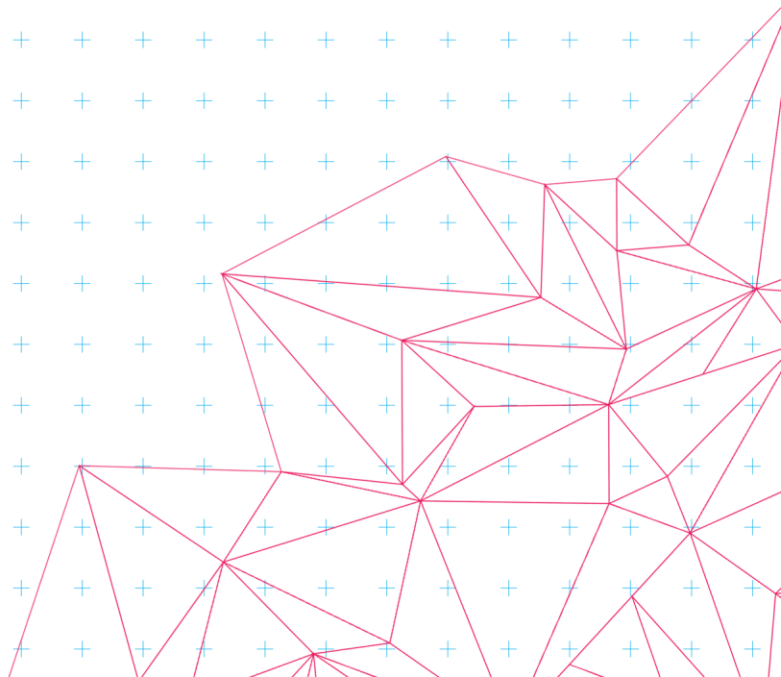
About the challenge owner

For this challenge ILI is the main owner, and works together with partners Signify and Team IGNITE.

The TU/e Intelligent Lighting Institute (ILI) was established in 2010 to investigate novel intelligent lighting solutions that will become within our reach by the large-scale introduction of LED technology, with a special emphasis on how these novel solutions might affect people. In addition ILI aims at providing scientific evidence for the claims that go with these novel lighting solutions.

Team IGNITE is the multidisciplinary student team from numerous diverse backgrounds, who design and build interactive lighting installations. They are experienced in creating innovative ideas and prototyping.

Signify (previously Philips Lighting) is the global market leader in energy-efficient and intelligent lighting solutions. Its purpose is to unlock the extraordinary potential of light for brighter lives and a better world. Philips products, Interact connected lighting systems, and data-enabled services transform people's lives in homes, buildings, and public spaces.



Challenge description

In many places where there is no electricity grid there is a need or desire for light. For example in parks where people would like to meet each other or go for a walk after sunset, or rural areas where public lighting is scarce, but people still would like to cycle or walk. But even more in areas that are devastated by natural disasters, such as earthquakes, severe storms or tsunamis that destroyed the infrastructure, and people living in war zones or areas that have no electricity grid at all. For such areas it would be great if people can have access to light that does not need a connection to the electricity grid. Moreover, current solutions (like solar powered lights) often are not sustainable, so we are also looking for more self-sustaining and sustainable solutions. This can be a circular design, or going even further, by taking inspiration from nature – such as bioluminescence.

You may also want to make use of advanced technologies such as Luminescent Solar Concentrators (which you may know from the GEM Stage) or create a whole new type of technology by yourselves.

In this challenge you will choose a context for which you will design self-sustaining light. In the project you will consider:

- *The desirability of the concept: what functionality is needed for the end-user and what interaction will the user have with the product or service?*
- *The technical feasibility of the concept: how can it be realized, what technologies will you use and how will it work (incl. for example energy management)?*
- *The economic viability: what is the business model, what is the value chain and how will the return on investment be achieved?*

Depending on your team composition you may want to pick certain aspects to focus on – related to the strengths you have in the team or the personal development areas you set for yourself.

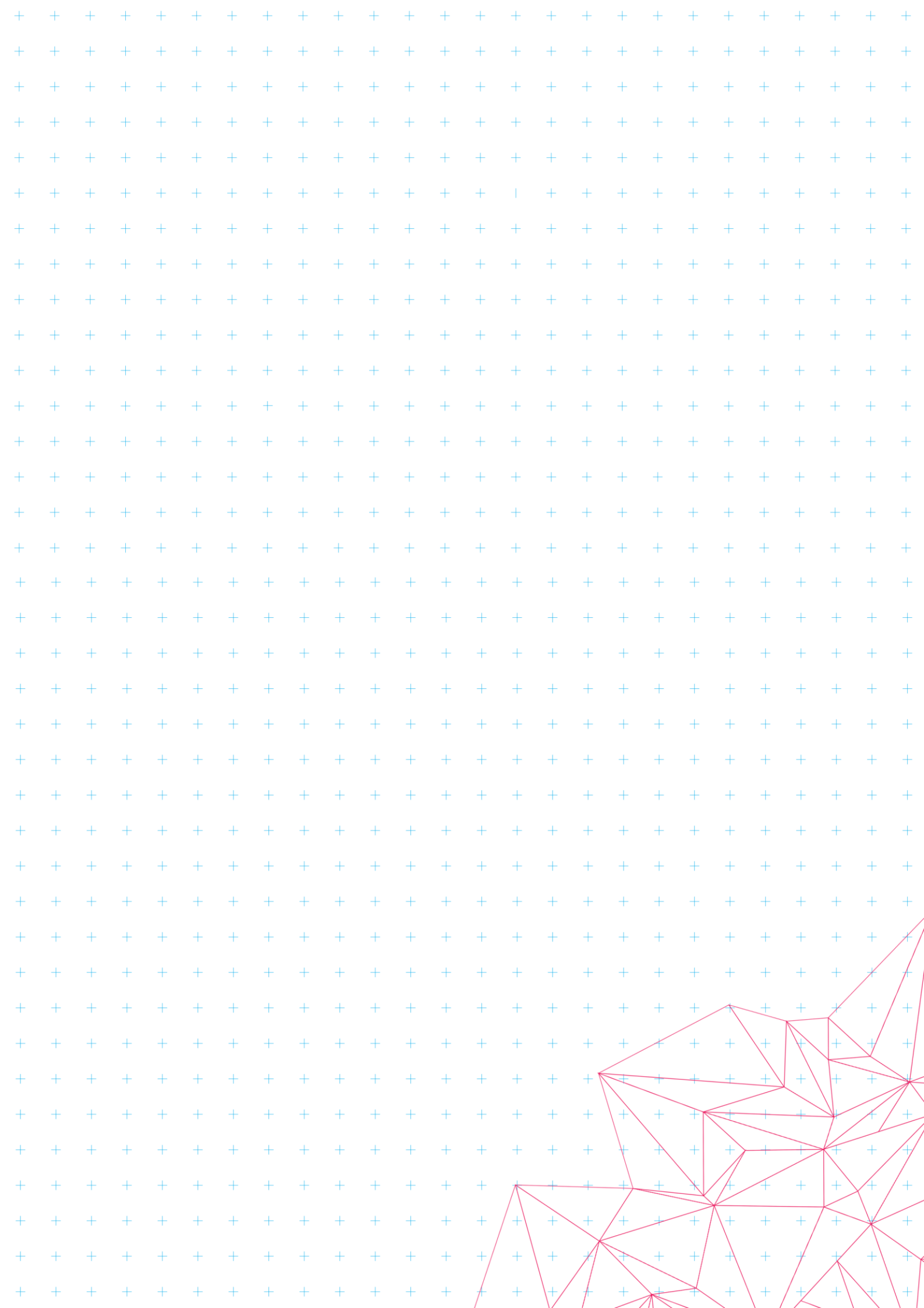
Challenge Picture

Input and involvement of challenge owner

We will help you create your own proposition and business idea. We provide our network with experts in the TU/e, but also our network with companies and public organizations with whom you can discuss your concept or test your ideas. We will also help you with finding the right contacts to set up experiments or validate your ideas in real life settings.
We are available on regular basis for discussion. We can also bring you into contact with our network of students working on lighting installations (Team IGNITE and beyond), that can also provide you with feedback.

Resources

We offer:
- *Coaching from the TU/e Intelligent Lighting Institute & Team IGNITE*
- *Access to experts from Signify*
- *Access to the network of students working in the lighting domain*
- *Support with finding partners for hardware you need for prototyping*
- *Support with finding people for interviews, partners for your business idea or test locations*



Roles of different disciplines (only for ISBEP)

Please describe possible contributions you expect to see from as many disciplines as you see fit for this project.
(On the next pages you find descriptions of the different departments).

Automotive Technology	-
Biomedical Engineering	-
Architecture, Urbanism and Building Sciences	-
Computer Science and Engineering	Use knowledge on software engineering, system integration and programming to make the self-sustaining light function has a whole.
Data Science	-
Electrical Engineering	Use knowledge from electric circuits in ways that enable the generation and the storage of energy in the self-sustaining light in innovative ways. Additionally, an Electrical Engineering student can make calculations for the technical criteria of the project.
Industrial Design	Use knowledge from design processes to guide the team in its creative process to find new, innovative solutions to create a self-sustaining light. Additionally, an Industrial Designer can create the lamp in such a way that the user finds it satisfactory and intuitive the use the product.
Medical Sciences and Technology	-
Psychology and Technology	Use knowledge on human-technology interaction for theoretical input in the design phase. Additionally, a Psychology & Technology student can design and conduct quantitative and qualitative research to test the validity of the product.
Chemical Engineering and Chemistry	Use knowledge on chemical processes to evaluate, model and predict an energy independent way of inducing electricity. Additionally, a Chemical Engineering and Chemistry student can integrate knowledge on materials in the end project.
Sustainable Innovation	Use knowledge on sustainability to provide the team with context of economics, sustainability, business models to create the right development strategy for implementation of the product. Additionally, a Sustainable Innovation student with the Energy track can think of new and sustainable ways of generating energy.
Industrial Engineering	Use knowledge about the market, business models and supply chains in the design process. Additionally, an Industrial Engineering student can use its knowledge on optimalization of processes to ensure that the product is economically feasible.

Applied Physics	Use knowledge on energy and physical phenomenon to model a realistic representation of the product to be able to ensure that the product is technologically feasible. Additionally, an Applied Physics student has experience with translating theoretical knowledge to practical applications.
Applied Mathematics	-
Mechanical Engineering	-