

# Philips hue

Making lighting wireless and personal

Forget having just one light bulb moment. The team behind Philips hue had dozens on their journey to creating one of the company's most talked about recent innovations. Developing the smart connected lighting system that allows people play with tone, brightness and color to create any mood they can think of took determination and lateral thinking, as well as crucial insights from some key partners. Today, hue continues to evolve and improve thanks to the team's bold decision to allow programming enthusiasts to dream up new apps of their own. It's hard to imagine that it all started with one man's side project and a simple app.



**PHILIPS**

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*George Yianni, Technology Specialist at Philips Lighting*

### Connecting the dots

When the iPhone 3 launched in 2008, allowing the public to develop apps of their own, Pei-Yin Chao, a young interaction designer at Philips, had the first light bulb moment of the project. “I felt certain that apps could open up a whole new dimension of design freedom and business opportunities,” he explains.

He took a Philips LivingColors lamp, which enables people to choose from a range of colors and tones using a dedicated remote control, and decided to take it to the next level. “I wondered what would happen if I took the lamp, which uses a static color wheel on its remote control, and made a much more dynamic display on a smartphone.”

Convinced he could give users a much richer experience of lighting their homes, Pei-Yin worked on the project during his free time. Together with a colleague Tom Djajadiningrat, he made a working prototype app of the original wheel that works with a LivingColors lamp. He also made mock-up images of other ideas for apps he had. These included a choice of different color wheels depending on the season, themed colors like sunset and beach, and dynamic effects like a fireplace app that makes the lamps flicker in red, orange and yellow tones.

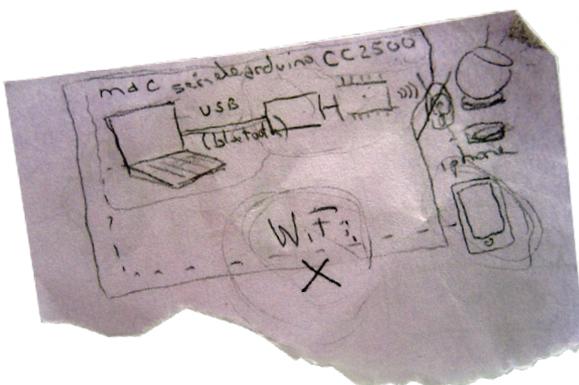
The two then presented the prototype to management in order to inspire them about the potential of using apps.

### Great minds...

At the same time, a technology specialist in Philips Lighting called George Yianni was working on ways to use smartphones to enhance the user experience of lighting. He knew that research showed that people love using lights to set themes in their homes. The problem was that not everyone wanted to control light in the same way or for the same reason. “That meant a lot of remote controls cluttering up the living room,” he explains. “Which is why the idea of using a smartphone to do everything changed the game.”

George elaborated on Pei-Yin’s original idea. Together with Philips researchers, he made the first version of the bridge – the device that gets the smartphone or PC to talk to the light – and developed some of Pei-Yin’s ideas for more elaborate apps, like the fireplace. The development team presented the prototype at an internal lighting event, and wowed their audience.

What followed was an intense period during which the team developed the concept in a technology incubator, led by corporate venture veteran Joost Horsten. They wanted to find out what kind of systems could be built, what kind of business model would work best and what the possible applications for lighting would be.



Tom Djajadiningrat’s first sketch of a prototype connected lighting system to control the settings of a LivingColors lamp using a smartphone.



Original LivingColors color wheel remote control



Prototype app for a dynamic color wheel



A mock-up idea for a fireplace app

By now, the project had caught the eye of Philips strategic lighting expert Filip Jan Depauw. He saw potential, but knew that they needed to uncover more reasons why customers would use it. “Just because we can connect lights to the internet, why would we?” Filip Jan says he asked the team. He knew that traditionally, people saw lighting merely as a simple matter of turning switches on and off. So why would they want to do anything else? “The answer – and the essence of hue – is personalization,” he continues. “It gives people control and allows them to find the best use on their own.” So far, so good, but they still needed to work out how people would personalize their lights.

To do so, Filip Jan knew just the team he needed. He’d just seen a presentation by a small, cutting-edge group of Philips researchers about how the future of retail lighting was in more flexible and dynamic systems. He asked them to set their minds to a similar task, but in the home.

### The Fab Four

The team – a dynamic duo of research scientists with design backgrounds called Dzmitry Aliakseyeu and Jon Mason – set about understanding what would drive change in the home and affect people’s lifestyles. They imagined future scenarios, which they wrote into engaging short stories, then sent these out online and asked for reactions from as many people as possible throughout the world, from families and teenagers to older generations and young professionals.

From almost 200 responses worldwide, they honed down the ideas into four themes, which eventually became the first four hue apps. “I called them the Fab Four – they were so spot on, we used all the ideas in the finished app,” says Filip Jan Depauw. These were: Welcome Home, which enables users to turn all the house lights on or off with one single finger tap; Indicator, which alerts people to news or alarms by changing lights; and Go Create, a way to reproduce colors in personal photos using the hue bulbs.

The fourth app, Welcome Home, was developed using research findings from another Philips project called SchoolVision. This project devised different light settings in a classroom, from ‘calm’ to ‘energy’, to help children concentrate more or relax more easily. Translated into the hue app, these settings help people at home to relax after a stressful day, or to give themselves more energy for working or reading.

### What they learned

With a working system and four great apps in hand, the team carried out home placement tests in Berlin, Shanghai and New York. Users loved the plug-and-play aspect – that it could be retrofitted easily into existing light fittings, and set up simply and quickly. But interestingly, no one single app came out as favorite: different people preferred different apps. Plus everyone wanted the four applications to be controlled by one single app, which the team created.

### The birth of hue

By this point, Filip Jan knew the hue needed to go to market with a bang. “With a system like this, which is so new and disruptive – so quite unfamiliar to people – we needed to give it a great personality,” he explains. And yet the hue brand still didn’t exist.

Together with an outside agency, they dreamed up the brand name, and the teams themselves worked on creating great packaging and clear messaging to emphasize how easy the system is to set up. They spent a lot of time making a quality bulb too. “Since it was going to replace an existing bulb in someone’s house, we wanted it to look better and create better light than anything that came before it,” Filip Jan explains.

Instead of using LivingColors lamps, the team had already developed a starter kit containing individual light bulbs. The idea was to make it easy for anyone to fit the system into their homes; while some people might not like the particular design of a lamp, most people will try out a

simple bulb. Plus, it puts the emphasis back on light effects (though the hue system is also compatible with the LivingColors range).

Finally, Filip Jan knew they also needed a store partner who would be able to display the system in an engaging way, and explain how it works to potential customers. The team found that partner in Apple, who agreed to an exclusive deal in their stores for four months at the end of 2012.

### Technical challenges

For the customer, the system seems simple, but it was a headache to perfect. George Yianni, who oversaw hue's technical development, says that putting the radio into the bulb was one of the biggest challenges. Bright LED bulbs need heat sinks to stop the components from overheating. But the metal they need for the sinks blocks the radio frequency from inside the bulb.

If they put the antenna outside the glass bulb, it created ugly shadows. But placing it inside the bulb reduced the range too much. In the end, they came up with an ingenious solution. "We positioned it in such a way as to induce coupling and use the metal heat sink as a kind of secondary antenna," George says.

### Developer community

One of the most difficult choices the team had to make was whether to make hue an open or closed system. To keep it closed would protect their proprietary work. To open up the software to the outside world was a big risk, plus it would need a team to keep updating the code. "But I felt that if we were going to make this a success, we needed to connect with the talent out there,"

says Depauw. "We can't possibly develop all the apps people might want – and remember, hue is all about personalization."

Today, there are thousands of apps from the developer community for both the iOS and Android systems, many of which are free to download. Filip Jan's son loves Hue Disco, which changes color and flashes in time with his music. Filip Jan meanwhile uses the geofencing app developed by Philips, which senses when the user is approaching or leaving home and turns the house lights on or off automatically.

He also loves an app developed with the Ambilight team at Philips to mimic the colors on a TV screen. "First, people had surround sound, now they have surround light," he quips. Meanwhile, a recent partnership with IFTTT ('If This Then That') allows users to link their hue system to more data streams to indicate weather changes or new text messages.

### Vision of the future

Because hue is a constantly evolving system, the team behind it sees all kinds of potential for the future. "The world has been talking about the idea of a connected home for a while, but this is it," says George, who believes that systems like hue can show people how lighting can improve their lives in all kinds of ways.

As a parting note, he adds that companies like Philips need to team up in order to develop the best game-changing new solutions for the home. "The more partners we work with the better, so we can start making the connected home a reality for more people."

For more information about Philips Hue, visit: [www.meethue.com](http://www.meethue.com)



Watch a video on the [birth of hue](#)



To find out how hue works, [click here](#)



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