PhD Position: Wireless Communication with Ambient Light

**Faculty/department** Electrical Engineering, Mathematics and Computer Science  
**Level** Master degree  
**Maximum employment** Maximum of 38 hours per week (1 FTE)  
**Duration of contract** 4 years  
**Salary scale** €2325 to €2972 per month gross

**Job description**

Your research goal will be to create wireless links out of ambient light.

For almost a century, radio frequency has monopolized wireless communication. Only recently, we have started to use visible light to transmit information. Key to this major development is the ability to modulate LEDs (similar to the concept of turning a flashlight on/off to send Morse codes, but at such high speeds that no flickering effects are created). But not all lights can be modulated. For example, we cannot modulate the sun, but it would be transformative if we could untap that vast amount of optical energy to carry out massive wireless communication. You will be part of team that is working towards creating a radically different wireless channel: one that relies solely on ambient light and operates in a sustainable (no batteries) and privacy-preserving (no cameras) manner.

You will develop a new communication platform based on smart materials that can control the amount of light passing through them (similar to the concept of using a mirror to communicate via light reflections). You will build novel hardware, model the platform mathematically, develop new wireless protocols and evaluate the overall system on real outdoor scenarios. The ultimate goal is to transform the ‘dead’ surfaces in our cities into wireless transmitters: ambient light will impinge over the exposed surfaces of buildings, cars, tram stops, etc., and these surfaces will reflect back light but with embedded information.

**Requirements**

Applicants must have a Master's degree in computer science, electrical engineering or a closely related field. A good knowledge of wireless communications and embedded systems is required. The position demands strong analytical and programming skills, as well as eagerness to build new systems and perform experimental work. The successful applicant should have good English language proficiency and a team player personality. Prior knowledge on Visible Light Communication is a plus.

**Information and application**

For more information about this position, please contact dr. Marco Zuniga, e-mail: m.a.zunigazamalloa@tudelft.nl. To apply, please go to the following link

https://goo.gl/forms/6O6AnFe4omD2SLiM2

to submit your CV (including contact to two referees), transcripts for your BSc and MSc, and a copy of your most representative scientific publication (in case you have one). The vacancy will be opened until filled. The planned starting date is September 2019.
Electrical Engineering, Mathematics and Computer Science @ TU Delft

The Faculty of Electrical Engineering, Mathematics and Computer Science (EEMCS) is known worldwide for its high academic quality and the social relevance of its research programmes. The faculty’s excellent facilities accentuate its international position in teaching and research. Within this interdisciplinary and international setting the faculty employs more than 1100 employees, including about 400 graduate students and 4000 undergraduate students. Together they work on a broad range of technical innovations in the fields of sustainable energy, telecommunications, microelectronics, embedded systems, computer and software engineering, artificial intelligence, interactive multimedia and applied mathematics (https://youtu.be/PsbUgi9A_cA)

Within the EEMCS faculty, the position is open at the Embedded and Networked Systems group, which belongs to the Department of Software Technology (ST).

The ST department comprises research groups working on core computer science and engineering topics. The department is responsible for a large part of the curriculum of the BSc and MSc programmes in Computer Science as well as the MSc programme in Embedded Systems. The department’s research mission is to perform excellent research at an internationally-recognised level in the design, construction and analysis of complex, concurrent and cooperative computer and information systems. Inspiration for the research topics is derived largely from technical ICT problems in industry and society.

The Embedded Software group (http://www.es.ewi.tudelft.nl) has the ambition to improve the software development and maintenance process for embedded systems, design new wireless networking paradigms, and make small/embedded networks less reliant on batteries. The Embedded Software group performs research on many breakthrough technologies, including energy-autonomous communications, wireless power transfer, visual light communication, and robotic systems.

Located in a charming college town, TU Delft is the largest and oldest public technological university in the Netherlands. The university is regularly ranked among the most highly-rated worldwide for engineering and technology. Information about academic careers in the Netherlands and working at TU Delft can be found at www.factcards.nl and www.tudelft.nl/en/about-tu-delft/working-at-tu-delft/coming-to-the-netherlands-tu-delft/.

Conditions of employment

The TU Delft offers a customisable compensation package. Flexible work schedules can be arranged. Salary and benefits are in accordance with the Collective Labour Agreement for Dutch Universities. As a PhD candidate you will be enrolled in the TU Delft Graduate School. The TU Delft Graduate School provides an inspiring research environment; an excellent team of supervisors, academic staff and a mentor; and a Doctoral Education Programme aimed at developing your transferable, discipline-related and research skills. Please visit http://graduateschool.tudelft.nl/ for more information.