The 3rd Isabelle Musy Award goes to a 3D concrete printing startup

The winner of the 2018 Isabelle Musy Award is Agnès Petit, the founder of Mobbot, a startup that develops and markets 3D printing systems for concrete. The award and its CHF 50,000 cash prize will be given to Petit at a ceremony tonight at EPFL. With a rendering as smooth as if the concrete had been formed.

Concrete has been around since the 19th century. Since then, it has become stronger, more flexible, more resistant and standardized across the industry, and it can be prefabricated. The time has now come to bring the process for pouring concrete into the digital era, moving away from forms and towards 3D printing. That’s the idea that Agnès Petit, the founder of the startup Mobbot, used to win over the jury and walk away with the 2018 Isabelle Musy Award.

After graduating from ETH Zurich with a PhD in cosmochemistry, Petit began working for concrete producer Holcim and then joined Creabeton, a manufacturer of concrete structures. “The wooden forms typically used for pouring concrete are too stiff and can’t be used to make customized shapes quickly and cheaply. And forms made using 3D-printing require a lot of raw materials and generate significant amounts of waste,” says Petit. That’s what prompted her – backed by ten years of experience in the concrete industry – to found
Mobbot, short for “mobile robot.” Her idea was to create a small, easily portable robot that could work directly at construction sites and build concrete objects using 3D printing. The robot would be programmed to extrude (rather than pour) the concrete according to the exact dimensions at the site and take into account any special configurations or obstacles.

“Typically an architect drafts blueprints on paper and gives them to a construction company, which in turn makes 2D diagrams of the wooden forms needed to pour the concrete. That eats up a lot of time and resources, and generally the forms have to be adjusted on site anyway. My idea was to eliminate all these steps and deposit the concrete directly, without having to create diagrams or forms,” says Petit. Her system can calculate the exact dimensions of concrete structures that need to be built using a scanner that generates a “cloud” of points in three dimensions; these points are then fed to a computer program that guides the robot’s arm as it deposits the concrete, much like a 3D printer would do if it was making chocolate.

The main challenge is to end up with concrete just as smooth as if it had been poured into a mold. The concrete mixture needs to be viscous enough that droplets can be deposited without running. However, the secret doesn’t lie only in the concrete composition, which should be as simple and conventional as possible, but also in the depositing system. And here Petit is keeping her novel design under wraps, and has filed for a patent to protect it.

The Isabelle Musy Award, established in 2014, recognizes outstanding women entrepreneurs in the fields of science and technology. Award founder Isabelle Musy, a retired teacher, wanted to encourage women to start their own businesses and asked EPFL to set up a selection panel to choose the most innovative business idea from a female entrepreneur.

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