



HALEY CHECKLEY | SPECIAL PROJECTS EDITOR

Fabian Winkler poses with a robot he says will learn to weed a garden plot through a series of advanced code created by his project partners.

## ‘Weeding Robot’ explores our relationship with nature

BY HALEY CHECKLEY  
Special Projects Editor

When a robot that is used for roadside bomb diffusions or for telesurgical medical operations is acquired by an artist, it isn't always clear what the intent may be.

But Fabian Winkler, a professor of electrical and time-based art, found an innovative way of utilizing the highly dexterous robot to explore a concept and possibly reinvent the field of agriculture.

Juan Wachs, an assistant professor of industrial engineering and partner with Winkler for his new project, said of the artists' ideas, "It is exciting to see how people coming from art can think out of the box when dealing with technology. Sometimes their ideas are totally crazy— but 'crazy' is a great starting point for revolutionary inventions."

The exhibition idea is to use the robot to weed a garden. Equipped with a stereo camera on the front, the device will determine from the image what is a weed and what isn't. Then, through carefully designed code, it will eventually rid a garden plot of weeds.

This takes an expansive team that is made up of: Shannon McMullen, professor of electronic and time-based art and American studies; Tian Zhou, a doctoral student in industrial engineering; Arjun Narang, a masters student in electrical

and computer engineering; Wachs and Winkler. The collaboration aids in critical thinking on how we consider our relationship with agriculture and technology as well as developing a very marketable product for future use.

"The project itself basically centers around this idea of translating cultural concepts that are very ambiguous; in this case, the culture concept of weeds and how we look at nature ... and how can we translate this into computer code that is very black and white and to see what comes out of that from an artistic and an engineering perspective," Winkler said.

Narang, one graduate student partner, said he was interested in pursuing projects with robotics ever since his undergraduate work. Approaching a problem with an artistic outlook was a new experience for him, but one he says was beneficial to his continuing education.

"Winkler was kind enough to explain to me how this project brings art and technology together, thus provoking critical thoughts and debate around technology which is a major part of our social world," Narang explained. "I realized that as a budding roboticist I can learn a lot from art. I immediately decided to work with (Professor) Winkler, and this has helped me see technology from a different perspective."

Winkler explained his vision was to explore

our relationships between nature and technology, saying much of the two fields cross over in modern-day use. Speaking of genetically modified foods, he said his goal was to explore visual metaphors for relationships such as this.

The benefit of a field such as electronic and time-based art is the opportunity for collaboration across a variety of fields. As a young adult, Winkler didn't feel he fell into just one category of academic interest and, like the students he now teaches, feels that the cross-disciplinary nature of the field is gratifying.

As progress on the project continues, Winkler said space exploration is a considered application in the future.

"What if there's a need to grow food in environments where people cannot be there to tend them around the clock? This would be a project that could be of interest to NASA and other space-related industries," he said. "Some of these ideas (introduced by the project) are very important for people to basically respond to in a critical way and in an informed way ... and to shape the future of the fields of agriculture, fields such as food security for the well-being of our planet, and I think art can play a very important role there."

The team hopes to finish the project by the end of the year and would like to tour it to various agricultural and engineering universities.