

## Alfred University researcher earns place in Guinness Book of World Records

6/12/18



Soutik Betal

ALFRED, NY A robot invented by a researcher in Alfred University&s Inamori School of Engineering during his doctoral dissertation at the University of Texas-San Antonio has been cited in the Guinness Book of World Records as the world&s smallest medical robot.

Soutik Betal, Ph.D., a postdoctoral researcher fellow working under Dr. Steven Tidrow, Inamori Professor of Materials Science and Engineering at Alfred University, earned a doctoral degree in electrical engineering at Texas-San Antonio in 2017. While studying for his Ph.D., Betal designed and constructed a nanoscale robot that is remotely controlled by magnetic field and can interact with biological cells. The robot is approximately 120 nanometers in size: one nanometer is equivalent to one-billionth of a meter.

The robot, Betal explained, is a prototype which researchers hope will be implemented in the near future, revolutionizing the treatment methods for diseases such as cancer, Alzheimer&s, and Parkinson&s. Because of its small size, the robot can be introduced into a biological cell environment, target specific cells and perform various remotely-controlled robotic cellular interaction.

“Cancer can be treated by specific cell detection, targeted electroporation and controlled drug delivery,” Betal said. “One of the major advantages of using this (robotic) technique over current cancer curing technique (i.e.

chemotherapy) is that these nanorobots provide a very localized treatment without exposure to unaffected areas, as compared to full-body exposure in chemotherapy.”

Betal said the robot can sense the difference between cancerous and non-cancerous cells based on electrical energy differences and can selectively permeate cancerous cells for treatment (drug delivery).

The robot has the potential as well to treat Alzheimer&s and Parkinson&s. “Alzheimer and Parkinson&s can be treated by targeted or modified cell transport for vascular repair and by regenerating the dried neuronal pathways,” Betal commented. Another potential use is in the vascular repair of transplanted organs.

The robot was designed and fabricated by Betal at Texas-San Antonio in the fall of 2015. Its remote-controlled functionalities in a bio-cellular environment were experimentally verified a year later with a group of biomedical engineering researchers. The research was published in Scientific Reports in January 2018.

Betal and his doctoral supervisors at Texas-San Antonio, Dr. Ruyan Guo and Dr. Amar Bhalla, submitted the application to the Guinness Book of World Records earlier this year and this month received Guinness World Record title of the “World&s Smallest Medical Robot.”

Betal has been working with Tidrow as a postdoctoral research fellow at Alfred University since January, conducting research on supercapacitors and dipole engineering.