

Robot Therapy

UNH Team awarded \$750K grant to develop robots for therapeutic exercise training

Tuesday, October 9, 2018



An interdisciplinary UNH research project that brings together computer science and human movement could lead to intelligent robots that guide patients through therapeutic exercise training. The project, led by Momotaz Begum, assistant professor of [computer science](#), Dain LaRoche, associate professor of [exercise science](#), and Sajay Arthanat, associate professor of [occupational therapy](#), recently received a \$750,000 grant from the National Science Foundation (NSF) Division of Information and Intelligent Systems.



MOMOTAZ BEGUM

“This NSF grant will help us to design robust robot learning algorithms that will be tested on real users for exercise training,” Begum says. “Such interdisciplinary efforts are a key to bring learning-based robotic systems out of the laboratory and employ them in the service of humans.”

The research project is designed to

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DAIN LAROCHE

help address a significant shortage of physical and occupational therapists anticipated over the next 20 years by developing intelligent algorithms that allow robots to learn new exercises directly from demonstrations by a therapist. The intelligent robots are not programmed but rather utilize a new learning from demonstration (LfD)

framework. LfD enables a robot to function in a teaching capacity for patients as well as to evaluate quantitatively a patient's performance of the training exercises.

“For robot therapists to be effective, they must be able to model an exercise accurately, assess patient performance of the exercise and provide correction in real time and be accepted by patients and clinicians,” says LaRoche.

This collaborative project brings together strengths across three different disciplines and two colleges, the [College of Health and Human Services](#) and the [College of Engineering and Physical Sciences](#), at UNH and reflects an institutional commitment to supporting interdisciplinary collaboration. Initial funding for the research came from the [Collaborative Research Excellence \(CoRE\)](#) initiative, an internal grant program now in its second year.



SAJAY ARTHANAT

“The CoRE program allowed us to assemble a research team with the complementary skills needed to develop and evaluate therapeutic robots,” LaRoche says. “It mitigated the barriers of collaboration and supported an initial research study that was the foundation for the NSF grant application.”

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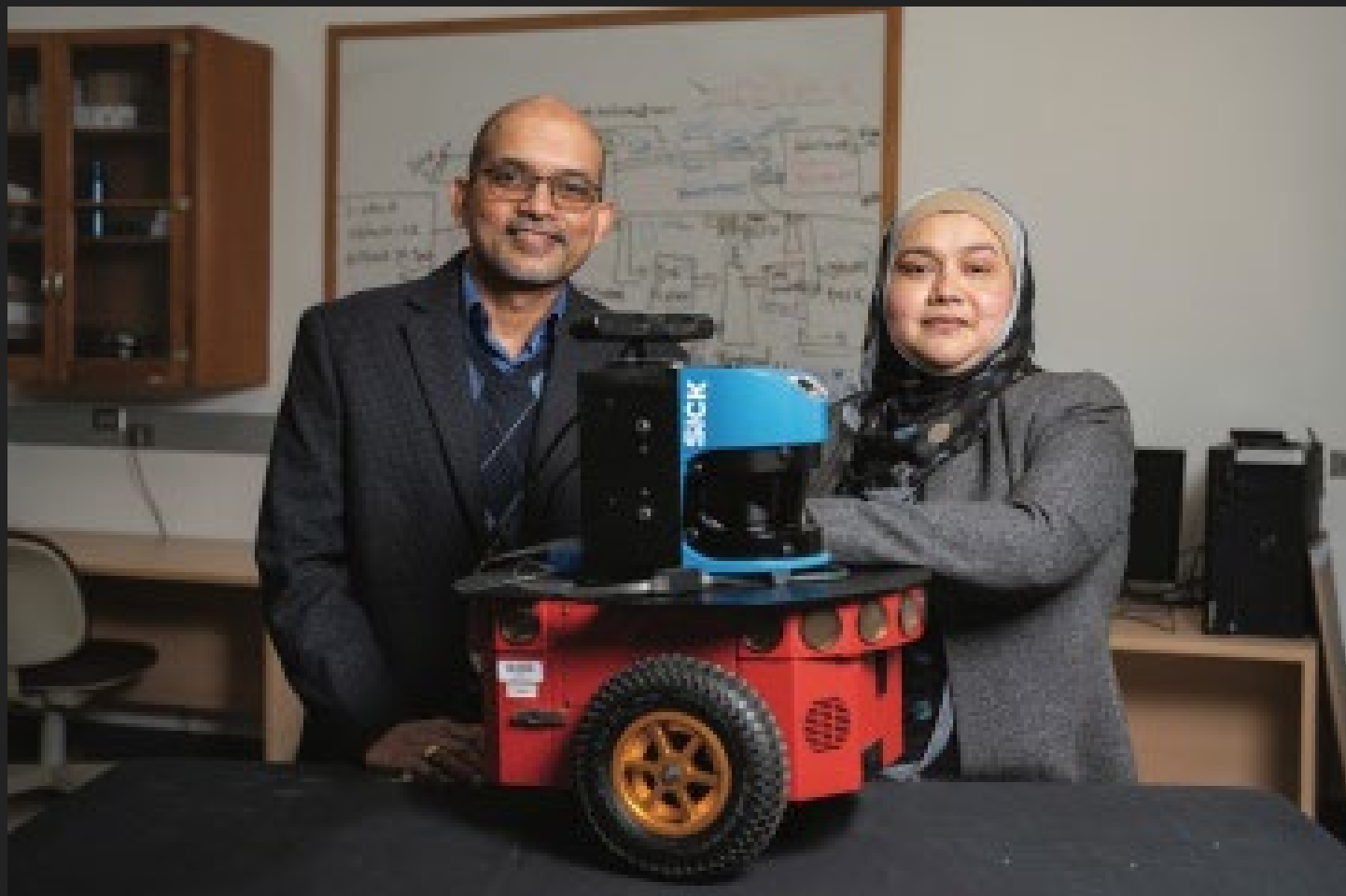
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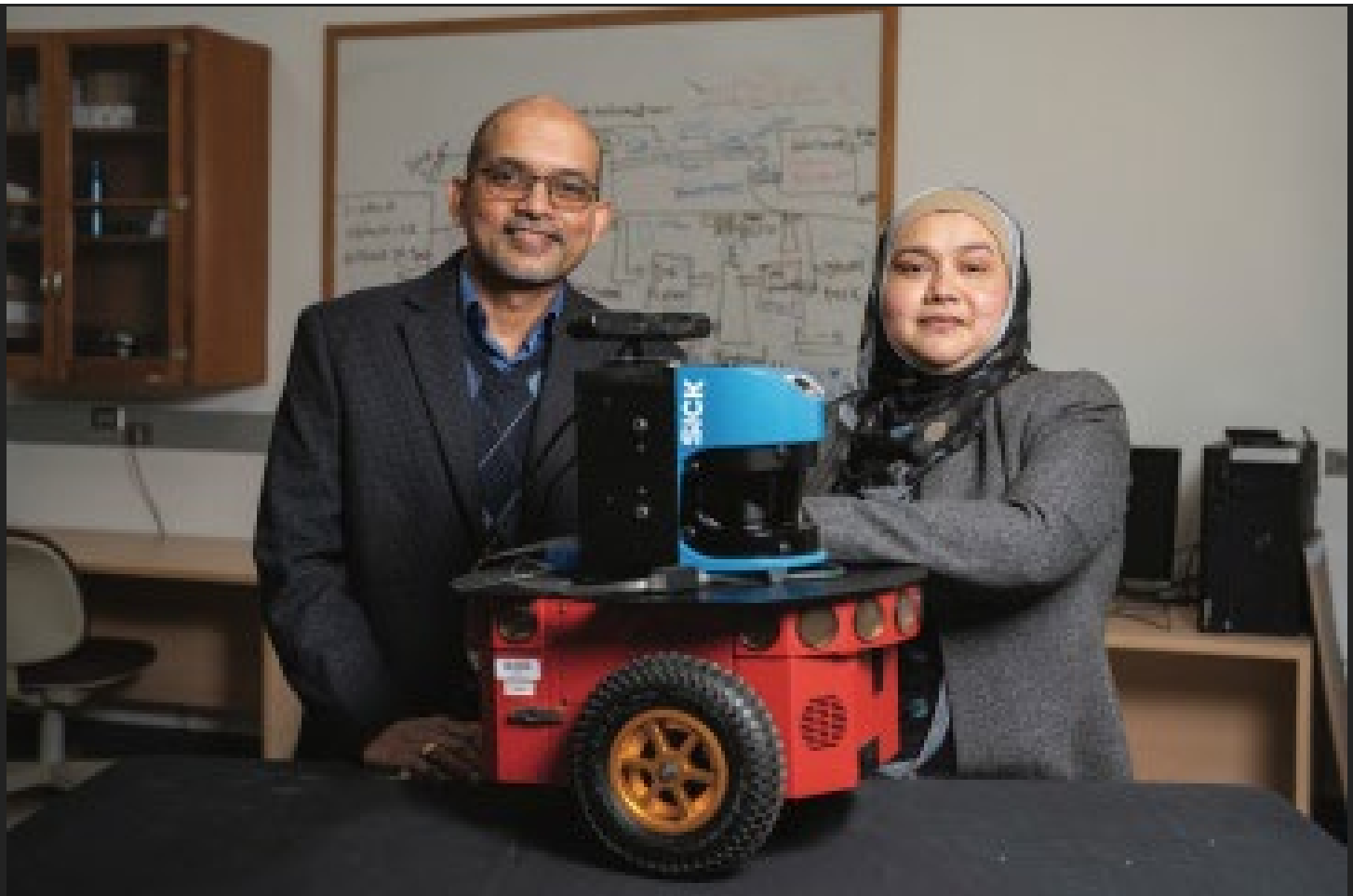
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