ME Seminar

Development of programmable physical systems at Toyota Research Institute North America

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ABSTRACT

Future mobility solutions that are capable of accommodating occupants of varying sizes and needs while improving energy efficiency, comfort and safety are highly desired. Adaptive designs capable of reconfiguring and adjusting to occupant size, environmental conditions, and performance criteria can help in achieving the desired goals.

At Toyota Research Institute North America, we are developing reconfigurable, programmable soft energy-absorbing structures using bi-stable elements, electrostatic clutches, shape memory polymers, inflatable structures, and other smart materials to enhance performance across the board. We are also exploring how such programable materials can help robots and exoskeletons that can work with humans. In the presentation we plan to share our current research activity, the technology under development, demonstrator systems, and key future challenges.

ABOUT THE SPEAKERS

Dr. Gandhi is executive scientist at Toyota Research Institute North America (TRINA), which is Toyota's core research division in the USA. Dr. Gandhi holds Ph.D. in Mechanical engineering from the University of Michigan and has worked for over 35 years in the Automotive industry. Dr. Gandhi is working on developing programmable structures to improve vehicles as well as robots. Dr. Gandhi is elected as fellow by two organizations, Society of plastics engineer (SPE) and American Society of Mechanical Engineers (ASME).

Dr. Gilmore received his PhD in Mechanical Engineering from Ohio State University in 2019. He has worked for Toyota Research Institute North America for the past six years as a research scientist. He has experience in a range of technical areas including programmable materials, energy storage and electrochemistry, and vibration isolation. Currently, he is developing adaptive and multifunctional materials and structures for future vehicles.

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