You are cordially invited to attend this seminar to be held on

**Tuesday, June 12th, 14:00**

**Room 106, Wolfson ”Tochna” Building**

**Materials for Soft Robotics**

**Dr. Aslan Miriyev**

*Department of Mechanical Engineering, Columbia University in the City of New York*

Engineering nature-like adaptive and intelligent robots requires development of material systems that permit inherent actuation, sensing and computerized control. In my talk, I will present my novel compact soft material-actuator approach possessing actuation ability as inherent responsive property, aimed at replacing conventional rigid motors and the existing soft-actuation solutions based on pneumatic or hydraulic devices. Specifically, I will discuss the composition-structure-properties relationships in a 3D-printable silicone/ethanol composite material and its implementation as a soft artificial muscle. In addition, I will present my work on conductive elastomer composites, followed by successful fabrication of all-soft material-actuators incorporating soft conductive heaters. Automated single-step fabrication of silicone-matrix composites using a newly-developed proprietary Artificial Muscle 3D-printer will also be demonstrated. Finally, I will highlight the barriers that still need to be overcome before truly nature-like intelligent autonomous systems can be engineered, including development of self-sensing soft-hard material systems and control of their functionality and performance using artificial intelligence (AI). I see this engineering challenge as a natural next step in the development of smart multifunctional composite materials combining sensing and actuation capabilities for Soft Robotics.

**Short bio** Dr. Aslan Miriyev is a materials scientist specializing in engineering and manufacturing of soft and structural functional materials, with a particular emphasis on Soft Robotics. Dr. Miriyev obtained his Ph.D. in Materials Engineering from Ben-Gurion University of the Negev (BGU), Israel, where he has been supervised by Prof. Nachum Frage and Prof. Adin Stern. Currently, Dr. Miriyev is a post-doctoral research scientist in the group of Prof. Hod Lipson at Columbia University, New York City. In this capacity, Dr. Miriyev has developed an approach spearheading a paradigm shift in the Soft-Material Robotics research, as it allows the conventional motors and actuation devices to be replaced by self-contained composite materials. His work received widespread media coverage by more than 70 media sources in more than 15 languages, while also reaching more than 7.3 million social networks users.