

**DEPARTMENT OF MECHANICAL ENGINEERING****SEMINAR****Online**

**Title:** Harvesting energy from steam using a soft biomimetic actuator

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**Date:** 20 April, 2022 (Wednesday)

**Time:** 11:00 a.m. (Hong Kong Time)

**Zoom meeting:** 1) Link to join the meeting:

<https://hku.zoom.us/j/93496971734?pwd=bFdjS20xSWNTNFRlOWJlQzB6OFVEQT09>

2) Meeting ID: 934 9697 1734

3) Password: 220743

**Abstract:**

Exhaust steam contains abundant energy, yet there is limited engineering attempt devoted to harvesting such energy, inducing tremendous energy loss. Here, we present a biomimetic actuator for energy harvesting from exhaust steam. This biomimetic actuator consists of a polyethylene oxide (PEO) layer for hydroscopic actuation and a polyvinylidene fluoride (PVDF) layer for power generation. Such PEO/PVDF actuator sustains reversible two-stage deformation in exhaust steam, delivering a maximum bending angle of  $760^\circ$ . A  $1.5\text{ cm} \times 3\text{ cm}$  PEO/ PVDF actuator achieves peak voltages of 4, 0.5, 3, and 2 V, respectively, upon exposure to the steam generated from mouth breath, wet paper, hot water, and solar evaporator, suggesting high-potential practical integration. The generated electricity from the actuator can be rectified and stored to operate low-power electronics, such as light-emitting diodes. Our study has paved a way for the future design of advanced actuators pertinent to low-grade energy harvesting for a sustainable society.

**ALL INTERESTED ARE WELCOME**

For further information, please contact Dr. L.Z. Xu at 3917 2628.

**Research area: Advanced Materials**