



## MESSAGE FROM HEAD OF PILLAR

Dear EPD family,  
February brings us more good news of faculty appointments and awards and more events for our students. Our EPD Seminar Series has also been received well and we have had the privilege to host many esteemed guests. We wish you a Happy Lunar New Year!



## EVENTS

<b>7 Mar</b>	EPD Industry Site Visit - Changi Airport	<b>8 Mar</b>	Shell Aviation Industry Roundtable	<b>13 Mar</b>	Aerodynamics Workshop	<b>14, 21, 28 Mar</b>	EPD Seminar Series	<b>16 Mar</b>	EPD 2D Racing
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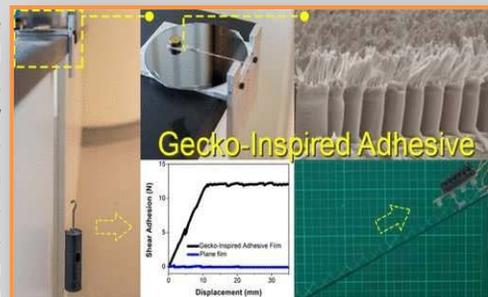
## ANNOUNCEMENTS

- EPD would like to congratulate and extend our full support to Associate Professor Arlindo Silva on his new appointment as Director for NAMIC Hub.
- Congratulations to EPD Junior **Joshua Loo Kim Hian** for achieving the Outstanding UTA Award Fall 2017 for his exceptional performance as an undergraduate teaching assistant!
- **Team Empower**, comprising EPD students **Anuradha Chopra, Kelly Khoo, Rebecca David, Nicholas Ng and Parekh Shalv Amit**, guided by profs Avinash Baji and Tee Hui, recently went to Phong Tanh, a village in Vietnam to test and develop their project. Their product aims to solve the problem of lack of continuous clean water supply by using a system which can generate and store electricity to filter water and store on a bicycle. Their project received support and commendation from the commune leader.
- A study by Dr. David Collins and Assistant Professor Ye Ai on "Self-aligned acoustofluidic particle focusing and patterning in microfluidic channels from channel-based acoustic waveguides" has been recently published in Physical Review Letters and highlighted as an Editors' Suggestion. This study will be highlighted in our next EPD newsletter.

## FEATURED: GECKO-INSPIRED DRY ADHESIVE BASED ON MICRO-NANOSCALE HIERARCHICAL ARRAYS FOR APPLICATION IN CLIMBING DEVICES

By Dr. Herman Raut, Associate Professor Low Hong Yee, Assistant Professor Avinash Baji, Professor Kristin Wood, Assistant Professor Soh Gim Song, Dr. Hassan Hussein Hariri and PhD student Hashina Parveen d/o Anwar Ali.

The unusual ability of geckos to climb vertical walls underlies a unique combination of hierarchical structural design and a stiffer material composition. While a dense array of microscopic hierarchical structures enable the gecko toe pads to adhere to wide range of surfaces, a relatively stiffer material ( $\beta$ -keratin) composition, enables them to maintain reliable adhesion over innumerable cycles. This unique strategy has seldom been implemented in engineered dry-adhesives that are based on stiffer polymers as fabrication of high aspect ratio hierarchical arrays using stiffer polymer is challenging. Herein, we demonstrate fabrication of hierarchical arrays on stiffer polycarbonate sheets by sacrificial layer mediated nanoimprinting (SLAN). As a result of enhancing the aspect ratio of the hierarchical arrays and replicating them over arbitrarily large-area substrates through the SLAN technique, a formidable shear adhesion strength of  $\sim 12.7$  N/cm<sup>2</sup> was achieved. The dry adhesive with state of the art adhesion strength was integrated into a climbing robot and climbing was demonstrated on a miniature robot. This research was conducted under the funding support from SUTD Temasek Lab.



Credits: American Chemical Society

Published in: Hemant Kumar Raut et al. Gecko-Inspired Dry Adhesive Based on Micro-Nanoscale Hierarchical Arrays for Application in Climbing Devices, ACS Applied Materials & Interfaces (2017)



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