



Society of Tribologists and Lubrication Engineers

Houston Section

## January 15, 2021 Technical Meeting

### Welcome to STLE Houston Section's 2020-2021 Lunch Seminar Series!

Our next technical seminar of the season will be held “virtually” on Friday, January 15th, 2021 at noon. Appu Vinod of Lamar University will be presenting ***“Hydrogel Tribology on Silanized Silicon”***. Please reserve the date!

**Abstract:** Retention forces of liquid drops on solid surfaces,  $f_{ij}$ , are expected to increase with the resting time, i.e. the time that a drop rests on a surface prior to its sliding. This is due to the reorientation of the solid molecules at the interface, which intensifies the solid-liquid interaction. This paper addresses a situation in which this reorientation-induced  $f_{ij}$  increase - is convoluted with the adsorption of solutes on solid surfaces. This happens for hydrogels (specifically we used a mixture of an aqueous solution of poly (vinyl alcohol) (PVA) and sodium tetraborate decahydrate (borax)). For this system, initially, the retention force decreases with resting time. As the resting time further increases, it reaches a minimum, after which the retention force increases and plateaus towards infinite resting time. This surprising behavior is reproducible. We explain these results as follows: the first reduction in the retention force is caused by the adsorption of the polymer molecules on the solid. This results in a polymer layer that becomes effectively part of the solid surface, and therefore the solid-liquid interaction is reduced, making it easier for the rest of the drop to slide over it while leaving a thin layer of polymer on the solid. As the resting time progresses further, the gel network develops loose physical crosslinks throughout the drop, thus forming a gel structure that anchors to the already existing polymer layer at the interface. Now, this layer serves to hold the rest of the drop, which results in a higher retention force at the longer resting times. We compare the gel behavior to known functionalities of gastropod’s mucus.

**Speaker:** Appu Vinod is a PhD student at Lamar University. Appu has been selected for a post-doctorate fellowship in Ben Gurion University of the Negev, Beer Sheva, Israel. Appu also enjoys reading and watching movies.

**Location :** Virtual.

### **IMPORTANT NEW PRE-REGISTRATION REQUIREMENT:**

Please register for ***“Hydrogel Tribology on Silanized Silicon”*** on January 15, 2021 12:00 PM CST at:

<https://attendee.gotowebinar.com/register/7485075351768262927>

**AFTER REGISTERING, YOU WILL RECEIVE A CONFIRMATION EMAIL CONTAINING INFORMATION ON HOW TO JOIN THE WEBINAR**

**Schedule:**

12:00PM - 1:00PM: Business Meeting and Technical Presentation

**Fees:**

None

The STLE Houston Section's Monthly meeting provides a platform to advance your knowledge, learn current trends in tribology, lubrication and related industries, and much more. We're hoping to be back to in-person meetings as soon as possible.

**STLE Houston Section Calendar of Events (2020 - 2021)**

September, 2020	Meeting Postponed to October	
October 9, 2020	Jeremy Kriska of Tulstar, <i>"Electric Vehicle Lubrication Challenges and Opportunities."</i>	Virtual
November 6, 2020	Gavin Duckworth of Functional Products, <i>"Using Unique Polymer Chemistry to Enhance Automotive and Industrial Formulations"</i>	Virtual
December 11, 2020	Michael D. Holloway of 5th Order Industry, <i>"Tribology of Diesel Engines"</i>	Virtual
<b>January 15, 2021</b>	<b>Appu Vinod of Lamar University, "Hydrogel Tribology on Silanized Silicon"</b>	<b>Virtual</b>
February 12, 2021	Akash Jena of Lamar University, "Tribology of Seawater and Oil on Silanized Polymeric Surfaces"	Virtual
March TBD, 2021	2021 Annual Houston STLE Lube School	Virtual
April TBD, 2021	TBD	Virtual
April TBD, 2021	Commercial Innovation Forum (jointly with April Meeting)	Virtual
May 16 – 20, 2021	75th Anniversary STLE Annual Meeting & Exhibition	Virtual
May TBD, 2021	TBD	TBD?
September TBD, 2021	First Technical Meeting of the new season	TBD?