

**DRAFT REPORT FOR THE PLASTINDIA INTERNATIONAL
UNIVERSITY WEBINAR ON
“SYNTHETIC FIBRES AND TEXTILES”
DEC 1ST, 2022**

As per part of a joint program between Plastindia International University, PIU, and UMass Lowell, the ninth webinar on “Synthetic Fibres and Textiles” was delivered by Prof Jay Park on Dec 1st 2022 06:00 PM (IST) / 08:30 AM (EST) onwards.

Ms Pratiksha Jaipal on behalf of Plastindia International University, welcomed all the attendees. She briefly reviewed the earlier webinars presented by Prof Wan Ting Grace Chen, Prof David Kazmer, Prof Stephen Driscoll, Prof Amir Ameli, Prof Davide Masato, Prof Nagarajan, Prof Meg Kline & Prof Carol Barry. She introduced Prof Jay Park who was the speaker for the ninth webinar.

Jay Park is a 5th year Assistant Professor in the Plastics Engineering Department at UMass Lowell (2018-). His expertise is in polymer processing, extrusion, fiber processing, polymer nanocomposites, and multi-scale material manufacturing. Park received his Ph. D. in Chemical and Biomolecular Engineering from Cornell University (2013) and a B.S. in Chemical Engineering from the Johns Hopkins University (2004). He subsequently held postdoctoral appointments at MIT (2017) and U.S. Army Research Lab

(2018), where he has gained expertise in high-performance fiber and plastics at both fundamental and application levels. In particular, he has expertise in process optimization of various fiber spinning methods, such as electrospinning, melt spinning, wet-spinning, and filament fabrication via FDM. His current research areas are i) smart functional textiles, ii) nonwoven materials for filtration, and iii) multi-material 3d printing.



Prof Jay Park presented a webinar on the topic, 'Synthetic Fibres and Textiles' on Dec 1, 2022. He quoted the dictionary definition of fiber and observed that fibers may have diameters from 10 to 100 microns and have a very high aspect ratio (length to diameter ratio). The fibers can be classified as natural and synthetic and the webinar covered essentially synthetic fibers.

The major uses are in the field of fiber optics or as strong reinforcement from carbon fiber, energy, non-woven or smart applications (electronic or non-electronic). Emerging

nano fibers have diameter from 50 to 500 nano meters.
Industrial fibers have many different type of non-cylindrical shapes.

GRAPHICAL RESUME

Dr. Jay H. Park

PLAS.3480 Heat Transfer (Spring)
FUNDAMENTALS OF Thermal-Fluid Sciences

PLAS 5500: Processing with Elastomers (Spring)
Basic Elastomer Technology

PLAS.5250 Synthetic Fiber Processing-Structure-Property (Fall)
FUNDAMENTALS of FIBER SCIENCE
XIAOWU ZHANG

Learning with Purpose

UNIVERSITY OF AKRON
Jay Park

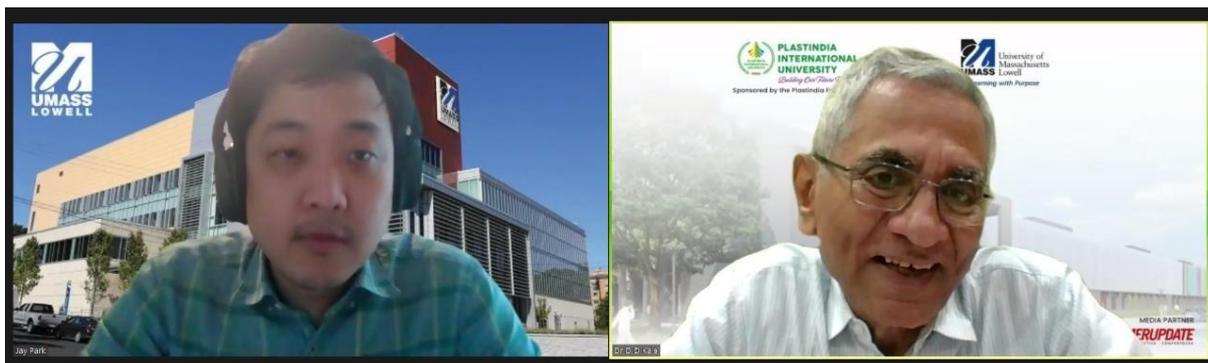
While presenting historical developments, he exhibited the picture of first machine used for making synthetic nitrocellulose fibers, built in 1889. The primary process parameters are – orifice shape, number of orifices, temperature, flow rate, take up speed, cooling rate etc. These influence the fiber formation through orientation.

When fiber process is considered, different forces of importance acting on fiber need to be considered. Rheological forces are most important in addition to drag force and pressure. The heat transfer is important and latent heat of crystallization has to be accounted for. The specific heat of melt and ‘solidified’ polymer can be different. At the temperatures encountered in fiber spinning, the radiation effects are less important as that contribution is less than 3 %.

Different aspects of wet spinning, dry spinning, gel spinning and electro spinning were reviewed briefly. The process for ultrathin fibers by centrifugal spinning and pull spinning was also briefly described. A guideline for the dimensions of different type of fibers and the application is presented.

Prof Dr DD Kale thanked Prof Jay Park for covering a very vast subject in a very simple way. Prof DD Kale conducted the Q&A session by forwarding the questions of relevance to the speaker. The vote of thanks was presented by Dr DD Kale.

The dates for the next webinar will be announced shortly.



Dignitaries from Plastindia International University and University of Massachusetts, Lowell, USA