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# **CORONAVIRUS TRIGGERED INNOVATIONS ACROSS THE GLOBE**



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## **About Author**

Sukanya Prasad is very ambitious and hardworking towards her career and has the zeal to excel in her professional sphere. Currently, she is pursuing M.Tech at **Indian Institute of Technology, Delhi**. Presently she is working on **“3D BIOPRINTING OF CARTILAGE”** as her M.Tech project.

In the year 2019 she had secured an **All India Rank of 33**. Her interview (<https://engineering.careers360.com/articles/gate-2019-topper-interview-air-33-sukanya-prasad>) got published in leading career counselling website <https://www.careers360.com/>. Prior to IIT Delhi, she joined Calcutta University for B.Tech.

She believes that balance is the key towards blessings. She maintains balance between her career and spiritual life. She has been practicing meditation from BRAHMA KUMARIS since past 6 years and believes that a meditative and focused mind can create miracles.

I (Sachin Gupta) am very proud of Sukanya as she is a previous student of Exponential Career Campus. She joined ECC for GATE 2019 & improved the reputation of ECC in Ed-Tech sector by securing a seat in IIT Delhi, a premium institute of country.

Written by:

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COVID-19 may be having a devastating impact on our industries, social lives and personal grooming standards, but it is also prompting an outpouring of creativity in other arenas.

From coronavirus detector Mask, to a mask which offers ease of having food with mask on, whenever you're about to touch your face, a wealth of new prototypes are

demonstrating what human ingenuity is capable of in the face of adversity.

Here are just some of the innovations.

## **Kawach**

Indian Institute of Technology Delhi, at first launched an affordable and effective face mask, **“KAWACH”** designed by **Prof. Bipin Kumar** and his team under the start-up known as **ETEX** for protecting and safeguarding people from the risk of COVID-19. The cost of N95



mask used for the protection against Covid-19 in the Indian market is quite high and the surgical masks have a low efficacy due to loose-fitting of such masks. **As per the team, “KAWACH mask is a multi-layer textile innovation for optimum protection at an affordable rate (₹ 45/- only) with 98% Filtration protection against 3 µm (micron) and 90% against 0.3 µm (micron).**

Ultra-soft fibrous lightweight material (<15 g) and advanced knitting technology have been used to give extra comfort to the wearer. 3D fit design, as par with N95 allows maximum face covering for protection. Mask is also tested and approved by the NABL accredited lab using international standards (ASTM F2299, ASTM F2101, IS 16289:2014, ASTM F1862/F1862M-13, 16 CFR Part-1610). **Further, “KAWACH is primarily made from biodegradable materials to save the environment.”**

## **NSafe Mask**

IIT Delhi next came up with Reusable Antimicrobial Mask named **“NSafe”** by **Prof. Mangala Joshi** and her team. **It is reusable upto 50 laundering and hence cuts down the cost of**



**usage.** NSafe mask is a highly engineered triple-layered product consisting of - inner hydrophilic layer for comfort, the middle layer having antimicrobial activity and the outer most layer having water and oil repellent behaviour. **NSafe mask has 99.2% bacterial filtration efficiency (at 3 microns)** and complies with ASTM standards of breathability and splash resistance. The mask is extremely comfortable and breathable. Elastic band in the chin region and wire in the nose region provides adequate fit of the mask to the wearer. **NSafe must be hand washed in cold water with a mild detergent (in order to regenerate its antimicrobial property) and has to be dried in sun.**

## **Personal Protection Equipment (PPE)**

This time, IIT Delhi came up with Personal Protective Equipment (PPE) Coverall (Integrated Body Suit and Shoe Cover), for the protection of doctors, nurses, paramedical staff and others, who are working day and night for saving lives of coronavirus infected patients. **It has been developed by Dr. S.M. Ishtiaque.** Special coating and treatment formulation have been applied over very light and compact polyester woven fabric which weighs around 300 gm. It has antibacterial property, and complete protection against corona virus penetration. **The outer surface also displays excellent water and oil repellency.** **The coverall can be reused three times.**



## **Membrane to make Mask more effective than N-95**

New replaceable and more efficient filter membrane that can be attached to a regular N95 mask and can be replaced when needed has been developed by researchers of King Abdullah University of Science and Technology (KAUST) Saudi Arabia. The researchers claim that the filter has a smaller pore size than normal N95 masks and hence blocks more virus particles. This has been developed to overcome the shortages of N95 masks.

The researchers first developed a silicon-based, porous template using lithography and chemical etching. They placed the template over a polyimide film and used a process called reactive ion etching to make pores in the membrane, with sizes ranging from 5-55 nm. The researchers then peeled off the membrane, which could be attached to an N95 mask.

## **Coronavirus Detector Mask**

**A small team of scientists from MIT and Harvard are developing a face mask that lights up when it detects coronavirus.** A fluorescent signal is emitted when a person with COVID coughs, breathes or sneezes nearby. **This technology could also wash out the flaws that come with other screening methods such as temperature checks.**

Not only transit systems such as airports and railways, this mask could be used for personal use as well as for hospitals as they screen in-coming patients. It could even be used for doctors to diagnose patients without having to send samples to a lab.



## **Microbes Destroyer Mask**

A Switzerland based hygiene company claimed that its disinfecting technology has been observed to destroy the novel coronavirus. *“The underlying principle is to empower the surface of the textile with a strong positive charge. When microbes come in contact with fabric, the microbial cell, which is negatively charged, is destroyed, leading to permanent destruction of the microorganism.”* Such masks can be used upto 210 times.

## **Smart Mask**

Japanese startup Donut

Robotics has developed an internet-connected 'smart mask' that can transmit messages and translate from Japanese into eight other languages. This has been developed in mind that face covers have become the new normal.



The white plastic 'c-mask' fits over standard face masks and connects via Bluetooth to a smartphone and tablet application that can transcribe speech into text messages, make calls, or amplify the mask wearer's voice.

The mask will come in Japanese market by September and will cost around Rs. 3000 each.

## **Sports Mask**

To ensure workout during the pandemic, Under Armour has come up with a “Sportsmask”. They say that the \$30 reusable black mask is water resistant and designed for maximum breathability which is a primary requirement during workout.



This mask has three layers. Two layers are made up of fabric and one is made up of foam. One of the fabric layer is also coated with PROTX2, an anti-microbial technology which has been shown to destroy COVID-19 in laboratory tests.

## **Virus-Killing Face Mask**

Researchers in Master Dynamic Limited (MD), a leading Hong Kong material analysis and nanotechnology company, is working on a mask coated with salt crystals and nano-diamonds to build “a new generation of virus-killing face masks”.

**Researchers in the lab believe that this unique combination could “Actually destroy viruses and microorganisms, rather than simply filtering them out”.**

## **Corona Neutralizer Mask**

A professor at the University of Alberta in Canada has created a mask coated in salt which could neutralize coronavirus in 5 minutes. The coronavirus-carrying droplets expelled during coughing, sneezing, speaking stays on the surface of the masks.

**When a virus carrying droplet settles on a mask coated in salt solution, it begins to absorb salt. Once the liquid evaporates, all that remains is the virus and the crystallized salt which eventually neutralizes it.** The process takes as long as it takes to evaporate water.

## **Charlotte Valve developed through 3D Printing**

Mako Design team Isinnova teamed up with Decathlon to design a 3D printed component, named the Charlotte Valve, which can easily fit onto masks. These 3D printed components can be turned into efficient respirators that can be used to aid patients.

Mako Design has also come up with a design that puts up both mask and headphones in one!



## **Self-Disinfecting Mask**

Researchers from Israel Institute of Technology have developed a self-disinfecting, reusable protective face mask. **The face mask that can be heated in a controlled manner – a process that destroys viruses that have accumulated on the mask – and renders it reusable.** The new technology is based on an inner layer of carbon fibers spread within the mask in a homogeneous manner. When the layer of fibers is heated using a low current (2 amps) from a readily available source – such as a mobile phone charger, USB connection, or other mobile electronic device chargers – the viruses are destroyed.

## **Have food with Mask On**

Israeli inventors have developed a face mask for eating out amid the pandemic.

*This mask is designed with a remote-controlled mouth that help people eat food without taking it off.*

With a squeeze of a lever, a person can open a slot in the front of the mask so that food can pass through it. The inventors plan to sell between Rs 65 to Rs 216.

