

The Philosophy of Thought and Scientific Logic Tackling Covid 19

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Abstract

In March 2020 Pope Francis took to the Vatican and stared out to an empty basilica. This was Easter Sunday, a significant date in the Catholic calendar and for many an end to the celebration of Easter week. There have been so many movies that, when the world gathered together in hope or prayer, this was one of the few venues humanities would turn to. The most terrifying in those images was pictures of Rome, such a vibrant, historically significant venue was a singular voice over the airwaves. Andrea Bocelli, the superstar tenor, did a livestream Easter Sunday concert from Milan's famed Duomo cathedral. Just like practically every other church in the world, the pews were empty, and Bocelli was accompanied only by organist Emanuele Vianelli. The concert was streamed live on Bocelli's YouTube channel on Sunday at 1 p.m. ET 2020. With his rendition of amazing grace, images of an empty world could only inspire:

"We are on the same boat, all of us fragile and disoriented... all of us called to row together," Pope

Francis, March 27, 2020



Figure 1: Pope Francis delivered an extraordinary 'Urbi et Orbi' (to the city and the world) blessing – normally given only at Christmas and Easter – from an empty St Peter's Square on Friday. The cardinal responsible for Rome has now been diagnosed with COVID-19 [Yara Nardi/Pool via Reuters] [1]

The world had just ground to a halt, people, whether scientists or politicians, businessmen or the might of great militaries never seen before, was helpless. No border was safe, no one individual could ignore the simple fact that a small organism, no bigger than an amoeba in the form of a virus, could make so little of all the accomplishments of man. The dinosaurs lasted millions of years, humanity had pulled itself up on two legs, was this to be the end of 250 thousand years. This paper, and in fact many of the articles, address science in all its forms and the philosophy behind our achievements, the core of which is a logical manner to making progress.

“Man becomes great exactly in the degree in which he works for the welfare of his fellow-men,”

Mahatma Gandhi (1966)

To this end, Covid is still with us, it's yet another obstacle for science and engineering to get beyond, regardless of politicians, business people and the combined military might of the world.

This virus is still with us and will be for some time yet, we only have preventative measures in place today, but humanity will find a way.

“Life’s most persistent and urgent question is, ‘What are you doing for others?’” Dr M.L. King, Jr.

1957 [2]

Introduction

There have been many challenges to humanities progress from cave dwellers to now contemplating flights to Mars. The world has known of great communications including the horse led armies of the Kahns, the spice routes from Asia to Europe to Polynesian great navigators across the vast oceans of the pacific. In fact, the globe while challenging, has pushed humanity to reach beyond local limitations and achieve greatness. The great structures of society are shown in Figure 2.a-f, these have lasted up to 2,000 years.



Figure 2a-f: A Nsude pyramid taken by G.I Jones 1935 from Southern Nigeria and date back as far as 'Modern' Myan buildings date back as far as 600 AD, The Temple of Kukulcán (El Castillo) is the most famous of the buildings in Chichen Itza.700 AD., The Giza pyramid complex seen from the south. From right to left, the three largest are: the Great Pyramid, the Pyramid of Khafre, and the Pyramid of Menkaure with three queen's pyramids., View from the Piazza di Santa Francesca Romana, Time Square, 2009, The Ming dynasty Great Wall at Jinshanling (a-f)

Some are now part of history based on learning, science, mathematics, humanities, politics and logic. However, no matter the period of history, we are a community that has never allowed the outside world and limit our ambitions. These ambitions have brought us beyond our

home and beyond. In fact, never has the world become so small that all places on earth and beyond are accessible, even into far space.

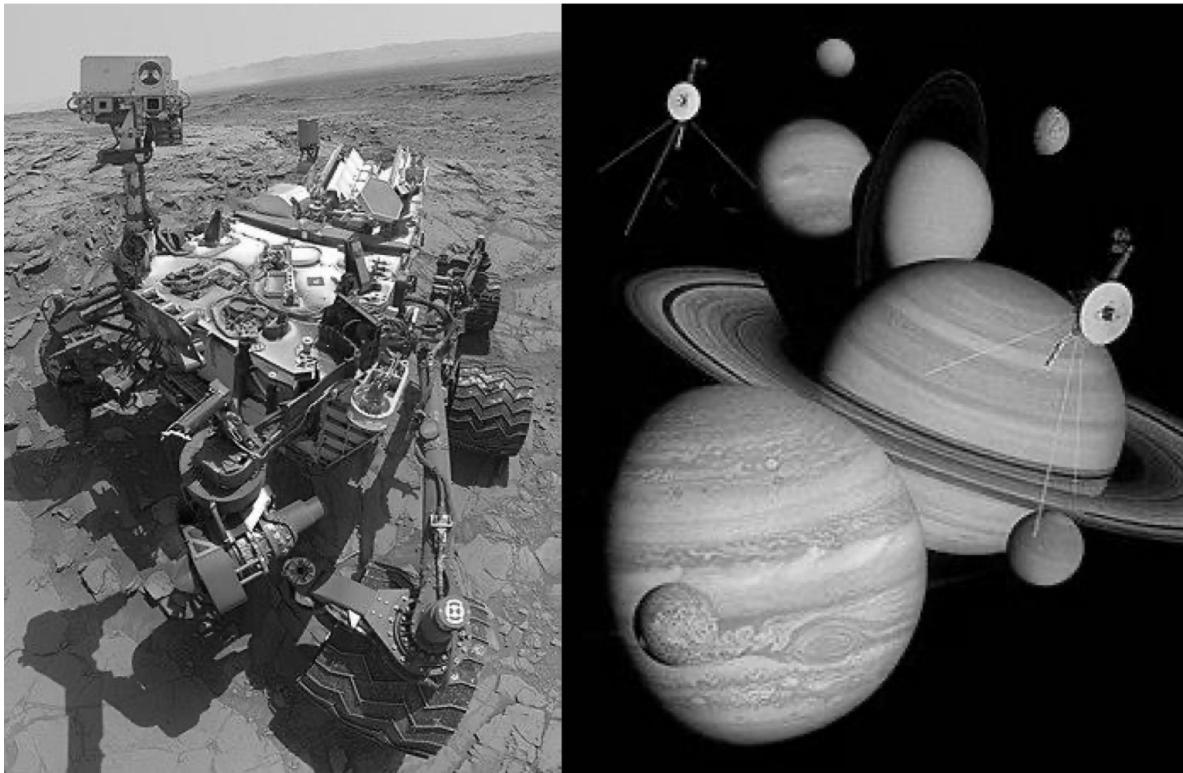


Figure 3: NASA's Curiosity rover, selfie, 2015, A poster of the planets and moons visited during the Voyager program. [3]

Impact of Covid

Humanity has seen so many terrible tragic events over time, when we look at modern recorded history there have been significant death rates caused by molecules so small they are smaller than the grains of sand on the beach. However, whether it's been the black death through the bubonic plague which can be carried for meters in aerosol droplets before reinfection or pneumonic plague, both of which require liquid aerosols before successfully reaching its target. The Septicemic plague requires transmission through bites which is significantly, insects or rodents before reaching its real potential. So, of the three main plagues dealt with, two are from aerosols while the third is from direct contact and resembles more like the horror movies of Hollywood. Regardless, when the black plague hit Europe and Asia, the death rates were between 30-60%,

in particular the ports, but the world kept the wheels of commerce turning. The same could also be said of the 'Spanish Flu', due to the free press in Europe, which actually originated from Haskell county in Kanas. It then spread to France and UK while Europe recovered from the devastation of World War 1, accounted for up to 17-50 million deaths. It was rebuilding and open commerce that had a major influence on the spread, which finally infected way after over ½ billion people. Table 1 shows just how many people were affected by viruses and bacteria over time, but yet humanity always finds a way.

"There is one area, though, where the world isn't making much progress, and that's pandemic preparedness. This should concern us all, because if history has taught us anything, it's that there will be another deadly global pandemic." Bill Gates, SHATTUCK LECTURE INNOVATION FOR PANDEMICS APRIL 27 2018

However, for all the warnings about different 'flu' like diseases spreading from Asia in the last 2 decades, the Coronavirus or H1N1 hit the world by surprise. In the beginning from Dec 2019 to February 2020 there were calls by a number of agencies including WHO and CDC of an infectious potential flu that could spread. It was only when we saw what was going on in Italy and Spain did countries start to react, but more like a reflex action. There were no plans in place despite warnings over the years, not the Americas, Asia, Africa of Southern Hemisphere. The scientific was likewise caught flat-footed and it was only dedicated labs working on such diseases that seemingly had any real insight into how big a problem the world was facing. Initial reactions of ignore by most countries, waiting for the US to provide guidance or those that simply decided to close borders was the general way the world went. For the first time in March 2020, the world ground to a halt, commerce stopped and a paralysis hit us all.

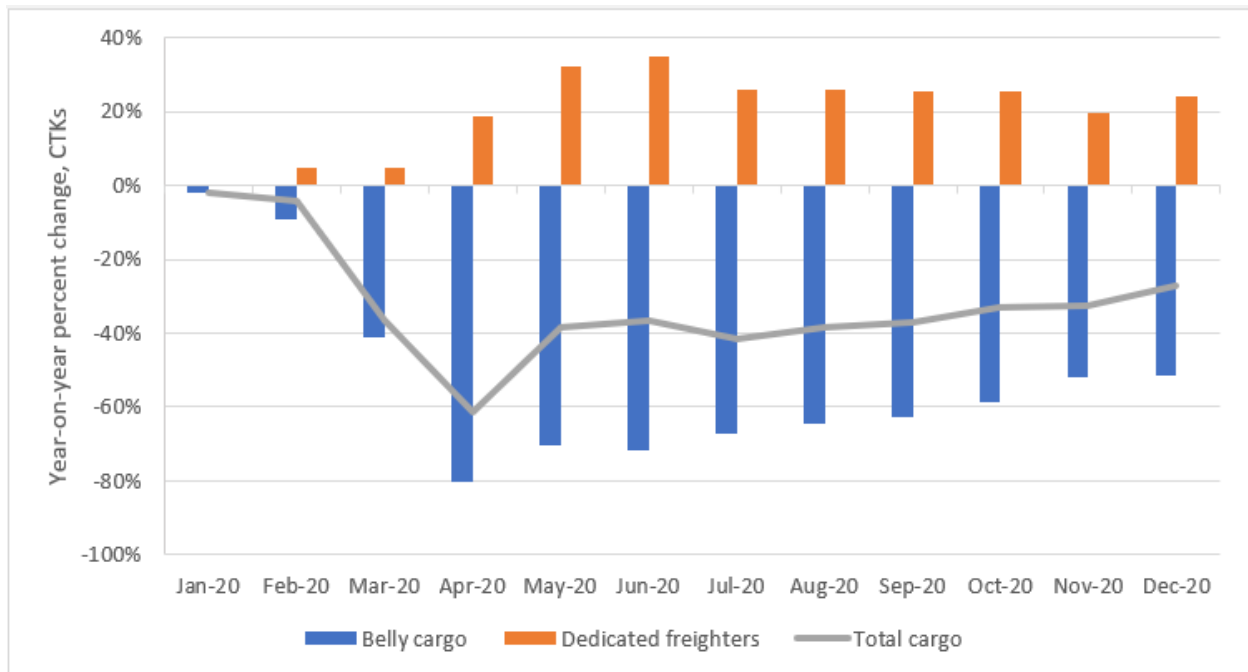


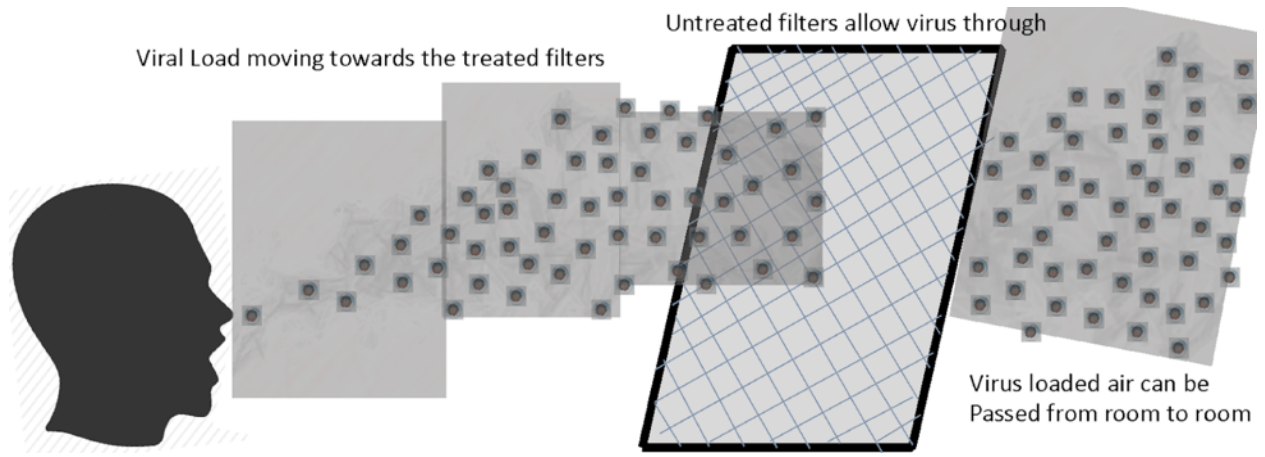
Figure 4: https://www.usitc.gov/research_and_analysis/tradeshifts/2020/special_topic.html

The world started to shut down in terms of people being able to gather together, from trading floors to transportation. Shipping for the first time in history ground to a halt, manufacturers could no longer rely on a healthy workforce, a classic example was meat production in the US, foods where so many caught covid by working on the floors and gathered in close spaces. Cruise ships were also berthed, some of which were broken into parts as they were no longer needed. For the first time, ports and shipping ground to a halt. It was clear that if you got the disease and had an underlying condition, this virus would kill. In fact, there were many cases documented in the US of adults fit and healthy giving way to this predator, so it killed regardless and the world waited on scientists to come up with solutions.

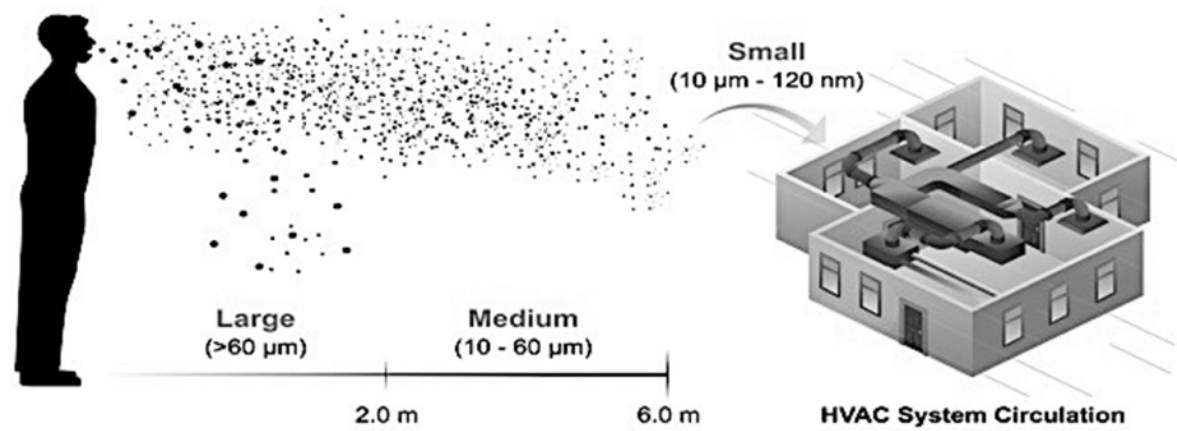
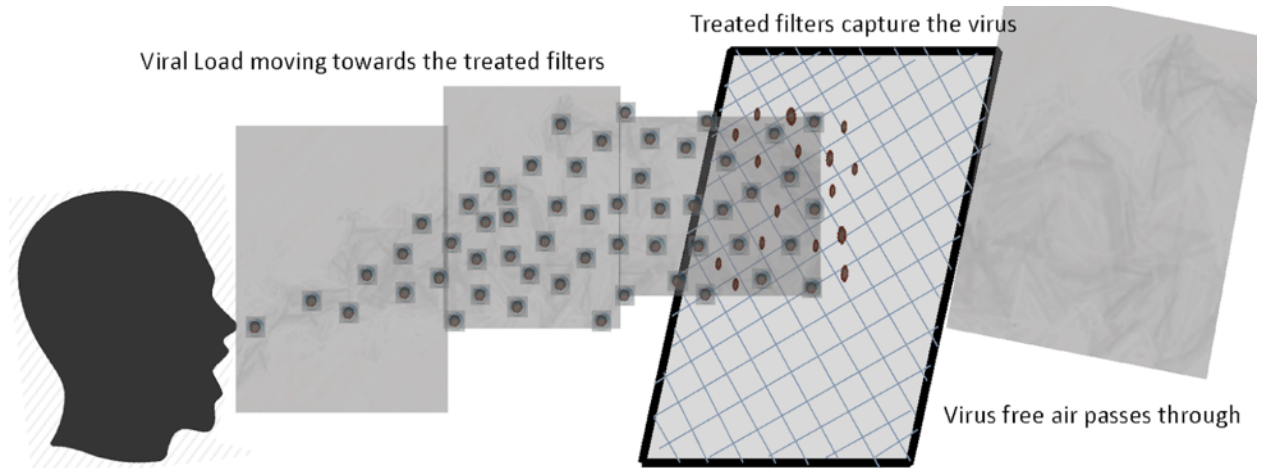


Figure 5: Five cruise ships are seen being broken down for scrap metal at the Aliaga ship recycling port in İzmir, Turkey. With the global coronavirus pandemic pushing the multi-billion dollar cruise industry into crisis, some cruise operators have been forced to cut losses and retire ships earlier than planned. The crisis however has bolstered the years intake of ships at the Aliaga ship recycling port with business up thirty percent on the previous year. <https://www.smb.com.au/traveller/inspiration/cruise-ships-and-covid19-incredible-photos-show-giant-cruise-ships-being-scrapped-20201006-b1r7kw.html>

There were the tried and tested solutions, none of which worked, to the more adventurous mRNA vaccine which found its way to the lectern in Sweden for the Nobel Prize in Medicine. However, in the meantime the world could not survive on reserves alone, people needed to eat, factories still had to manufacture and business had to come back. So, the very thing that could kill us all: mixing with others, was the very thing we needed to survive. The solutions were rather simple, cover face with a mask, avoid mingling and use suitable filters when indoors.



Virus loaded air can be passed from room to room.



Untreated filters allow virus through the rooms in a building allowing the spread of Covid 19. However, when the filter is treated the viral load moving from room to room is virus free, making spaces a lot safer. Precautions must be still taken because close contact can give rise to virus escaping through masks, even though N-95 are reasonably safe. It must be noted that face masks are not waterproof but reduce the passage of liquids significantly. It is only when they are repellant can they stop spittle (liquids from the lungs as well), but the challenge is breathability.

The Charlatan Game—Directly From The Tech Team

Uncoated filter fibers allow liquid to pass through, so providing a passageway for the virus to the lungs. Filtration technology allows for physical objects as they are designed for such matters, not for liquids. There has been a huge uptake in using UV light to destroy Covid 19. To be charitable, those that did so were trying to make it a better place for people to start their interactions. The truth is that UV lights, while incoherent (incoherent is the word for this form light such as light from the sun and even a light bulb), cannot get into the nooks and crannies in a room. They also destroy fabrics in half their lifetime expectancy as the polymers degrade very quickly. Finally, anyone who works with UV light will know that there is significant eye damage when exposed and will without question lead to blindness. Now simple logic, if you have to get out of a room before irradiating a room, the minute you open the door and step in you run the risk of re-infecting the room, making the whole exercise a pointless effort. Masks are not waterproof because they have to have breathability and that's why most are made from common threads such as polypropylene or polyethylene. But with breathability comes susceptibility to gas.

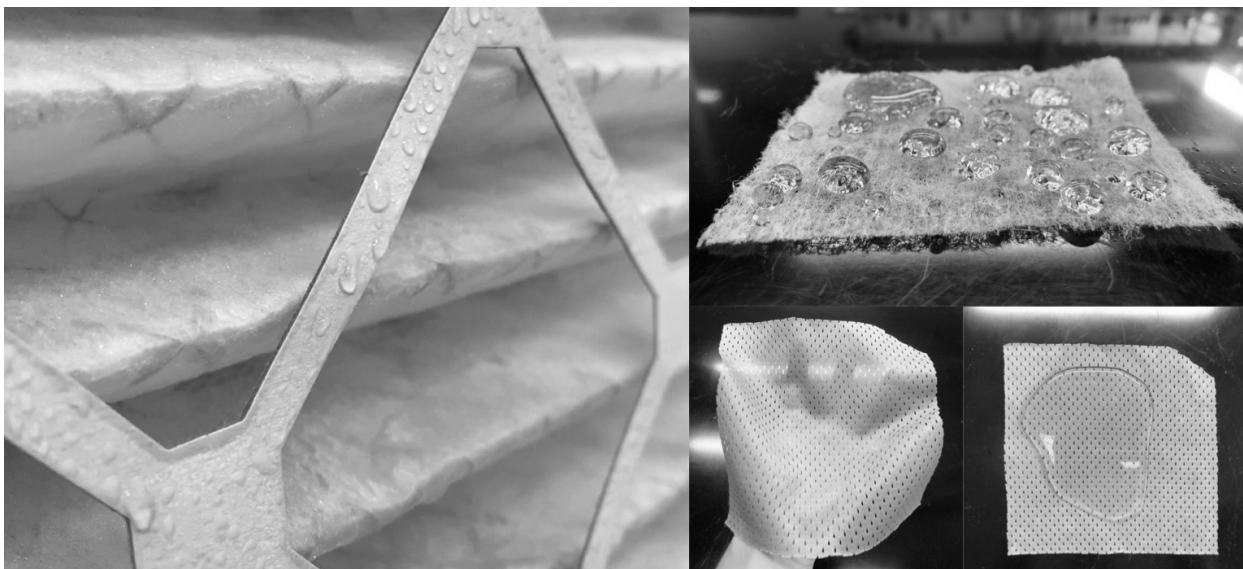


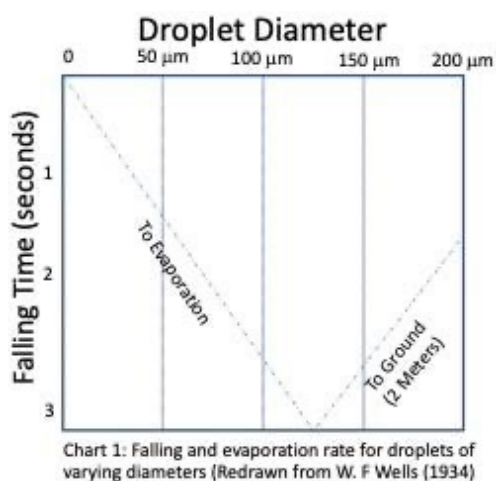
Figure 9: On the left is a filter that is untreated. On the right is Mervel 8 filter fabric and cloth with holes in fabric that are over 1 1/2 - 1/2 mm large, effective to prevent liquids from passing and we see the same effect when we look at the filters that have less than 500 nm diameter filter fabric layers.

We have seen many waterproofing products in the marketplace as well as in nature such as a lotus leaf that repels water. The most successful ones in the last few decades fall into a category known as surfactant fluorocarbons which are banned by the EPA and most countries around the world because of their toxicity risk. There are some others that base their technology on a thin layered coating (breathable), but these in general clog up filters as they form thin films in order to function. Some polymers are almost polished to be used as water repellent but that then means they form an air barrier in order to repel water, and so form films. The last group are made up of nanoparticles or beads made from a variety of materials, that fill in spaces within fabrics or surfaces but will eventually bleed out. None of these coatings are truly breathable and can be broken up easily and therefore unsuitable for many environments including filter fabrics. Our approach has always been very different; we have focused on creating molecules that are chain like in nature (polymeric), can bond chemically onto a surface, become part of the surface they are protecting and remain breathable. The last piece has always been the challenge for water proof coatings, but it was one of the main distinguishing aspects of our Curran Biotech

technology and follows a decade of research since 2010. The static tests are critical, as they will demonstrate the breathability of the coatings and therefore their applicability.

Viral Transmission

Several months into the pandemic, we have been well educated about the 6 feet apart rule to keep social distancing. It's worth asking, however: "Where did this rule come from?" Critically, it is based on work that was done in the 1930s by William F. Wells, et al [4] who measured the duration and distance it takes for large droplets to fall to the ground—on the basis of understanding the spread of tuberculosis. In fact, the presumption then was that the droplets were going to dry out and leave a virus exposed to the elements—desiccating within seconds. However, TB has proven to be very air stable. The distance calculated by the six-foot rule, also known as the d2 law, can only be applied to an isolated spherical water droplet.



With air drawn through the filter at a mean incident air velocity of 0.67 m/s and air temperature of 24.7°C, a target area (7.5 cm x 7.5 cm) on the front face of the experimental filter was sprayed with 1.0 mL of inoculum at a viral titer of 1.0 million genomes/mL. The collection/retention filter carefully removed and eluted. Experimental collection/capture filter swatches (FPR-10) were eluted in 100 mL of 1% beef extract/0.05M glycine (pH 9) for 20 min. The eluant was

concentrated to a final volume of 1.6 mL using a combination of tangential flow filtration and centrifugal ultrafiltration. Subsequently, 50 μ L of each sample was treated with 6.5 μ L of Proteinase K then incubated at 60 °C (15 min)/98 °C (5 min) prior to running.

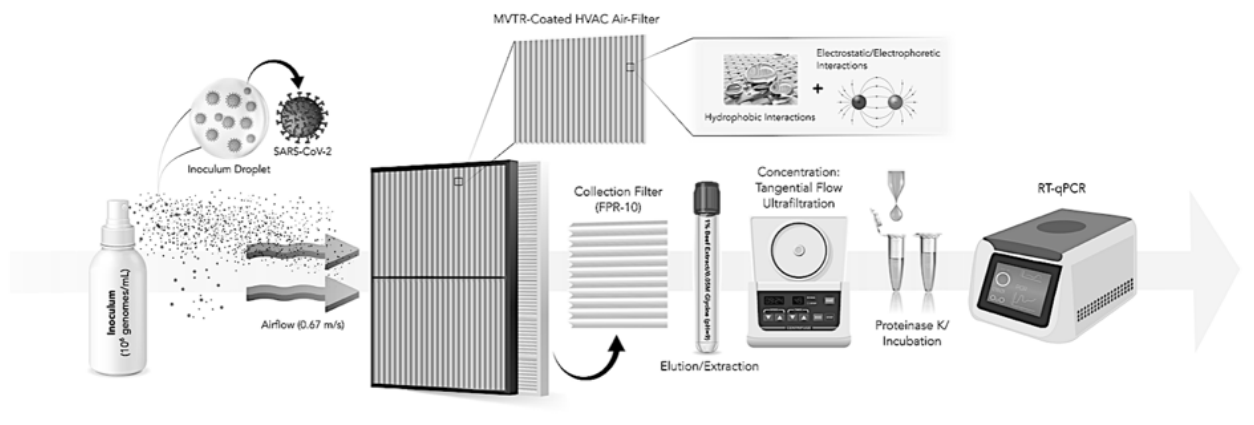


Figure 10: Generalized depiction of the experimental setup used to evaluate the performance of MVTR-A1-treated HVAC air-filters against untreated/pristine HVAC air-filters. Note that the graphical components are not drawn to scale and are only intended to convey the general experimental procedure.

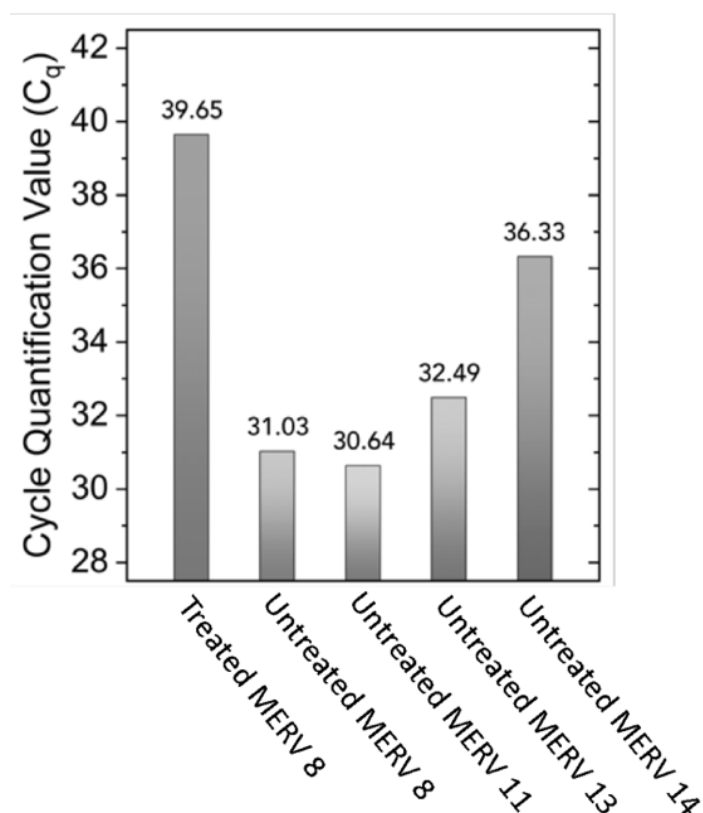


Figure 11: Cycle quantification values of an untreated MERV 8, 11, 13, and 14 compared against a treated (MVTR-A1) MERV 8 after 45 amplification/denaturation cycles.

A larger cycle quantification value (C_q) indicates a smaller initial concentration of captured thermally inactivated SARS-CoV-2 virions extracted from the collection filter, which corresponds to an increase in virion-filtration performance. We can see from this data that as we increase in MERV rating the cycle quantification requires a longer period before we get onset of fluorescence as there is less viral load penetrating the filters. The treated filters are far more effective than even the MERV 14 and reduce transmission to a negligible rate (*Figure 11*).

A more thorough examination of the process was to also look at the cycle quantification value and compare that to filter efficiency as shown in *Figure 4*. In this case on the bottom axis are the MERV ratings for different filters, on the left y axis is the cycle quantification value and on the right is the theoretical efficiency of the filters when dealing with virions that are smaller than 0.3 μm . Two lines are shown in the graph which depicts the actual values received for the cycle quantification value and the second is a theoretical estimation of what it should yield depending on the efficiency of the filter. This data shows that the performance of *MVTR-A1* is equivalent to or better than what would be expected for a MERV 14 or potentially 16 (we did not measure a MERV 16, only as high as 14).

Conclusion

Because the hydrophobic coatings are so very effective in reducing the water envelope around the virus, it will naturally desiccate within 40 minutes. The nature of the coatings is such that it also carries a permanent charge that will also pierce the lipid layer of Rhino viruses including Covid 19. The coatings are also air breathable so that they do not alter the flow. Because the hydrophobic coatings are so very effective in reducing the water envelope around the virus, it will naturally desiccate within 40 minutes without having to use any chemical or detergent sprays. There is no impact on the pressure drop pre and post spray application on the filters. While the coatings will last the lifetime of the filters and that the nanocoating will effectively clean the air

using filters that are coated, prevent transmission of the virus through the buildings, does this efficiently and economically without increasing substantially costs in the filtration system. No additional capital equipment is required. It does not improve the filtration system designated from a MERV 8 to above but is designed solely to capture virus in buildings and retard their transmission of gas through the filters.

Table 1. Epidemics and pandemics with at least 1 million deaths
(https://en.wikipedia.org/wiki/List_of_epidemics_and_pandemics)

Rank	Epidemic/ Pandemic	Disease	Death Toll	% Population Lost	Years	Location
1	Plague of Justinian	Bubonic plague	15–100 million	25–60% European	541–549	North Africa, Europe, Western Asia
2	HIV/AIDS pandemic	HIV/AIDS	44 million (2025)	–	1981–present	Worldwide
3	Black Death	Bubonic plague	25–50 million	30–60% European	1346–1353	Europe, Asia, North Africa
4	1918 "Spanish" influenza	Influenza A/H1N1	25–50 million	1–5.4% global	1918–1920	Worldwide
5	COVID-19 pandemic	COVID-19	7.1–36.5 million (2025)	–	2019–present	Worldwide
6	Third plague pandemic	Bubonic plague	12–15 million	–	1855–1960	Worldwide
7	Cocoliztli epidemic 1545–1548	Cocoliztli, caused by an unidentified pathogen	5–15 million	27–80% Mexican	1545–1548	Mexico
8	Antonine Plague	Smallpox or measles	5–10 million	25–33% Roman	165–180 (possibly to 190)	Roman Empire
9	1520 Mexico smallpox epidemic	Smallpox	5–8 million	23–37% Mexican	1519–1520	Mexico
10	1957–1958 influenza pandemic	Influenza A/H2N2	1–4 million	–	1957–1958	Worldwide
11	1918–1922 Russia typhus epidemic	Typhus	2–3 million	1–1.6% Russian	1918–1922	Russia
13	Cocoliztli epidemic 1576	Cocoliztli	2–2.5 million	50% Mexican	1576–1580	Mexico

14	1772–1773 Persian Plague	Bubonic plague	2 million	–	1772–1773	Persia
15	735–737 Japanese smallpox	Smallpox	2 million	33% Japanese	735–737	Japan
16	Naples Plague	Bubonic plague	1.25 million	–	1656–1658	Southern Italy
17	1889–1890 pandemic	Influenza or human coronavirus OC43	1 million	–	1889–1890	Worldwide
18	1629–1631 Italian plague	Bubonic plague	1 million	–	1629–1631	Italy
19	1846–1860 cholera pandemic	Cholera	1 million	–	1846–1860	Worldwide

References

[1] Pope Francis delivered an extraordinary ‘Urbi et Orbi’ (March 27th, **2020**)

[2] Dr. King’s 1957 speech, *Conquering Self-Centeredness*. (August 11th, **1957**)

[3] Voyager: Don Davis - ‘Artist's impression of the Voyager space probes (**1977**—) with the outer worlds they passed. Artist's description: *"This painting was commissioned by JPL to commemorate the outer planets mission of the successful pair of Voyager spacecraft. Although done in traditional media, computer drawings were generated as an aid to creating perspective rings of the proper scale for each world, which also has one Moon each highlighted. Only distant shots of Neptune were available at the time the work was done, and the hypothetical 'ring arcs' are included as modeled from earth based star occultation data. Acrylic on board for NASA, JPL."*

[4] W.F Wells et al (**1934**)