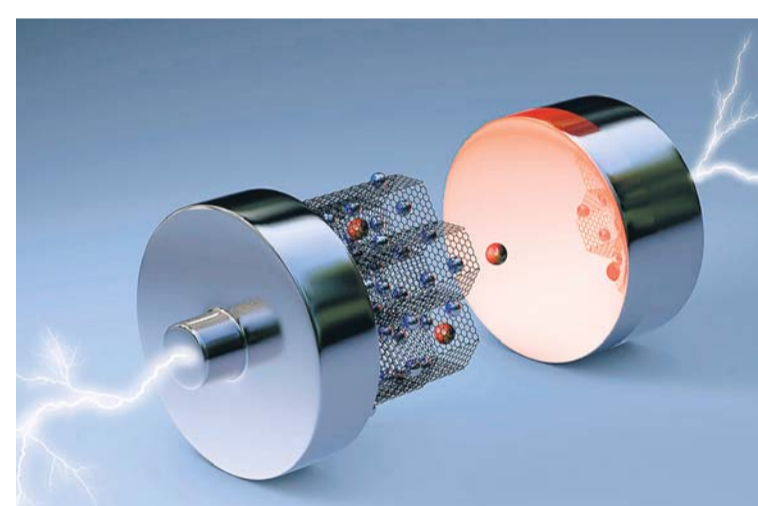


#IMPROVISING

Better and Cheaper Li-ion Battery Electrodes

Current lithium-ion batteries charge too slowly, and manufacturers typically use flammable, toxic, and expensive solvents that increase the time and cost of production



A team, led by Worcester Polytechnic Institute (WPI) researcher Yan Wang, has developed a solvent-free process to manufacture lithium-ion battery electrodes that are greener, cheaper, and charge faster than electrodes currently on the market, an advance that could improve the manufacturing of batteries for electric vehicles.

In the journal *Nature*, the group reported on a dry-print manufacturing process that avoids the toxic solvents and the long drying times needed when manufacturing electrodes with slurries and conventional production methods. Wang, who is the WPI William B. Smith Dean's Professor in the Department of Mechanical and Materials Engineering, said that the new process could be scaled up and reduce electrode manufacturing costs by up to 15 per cent, while also producing electrodes that can charge faster than conventionally produced electrodes.

"Current lithium-ion batteries charge too slowly, and manufacturers typically use flammable, toxic, and expensive solvents that increase the time and cost of production," Wang said. "Our solvent-free manufacturing process addresses those disadvantages by producing electrodes that charge to 78 per cent of

capacity in 20 minutes, all without the need for solvents, slurries, and long production times."

Commercial lithium-ion battery electrodes are typically made by mixing active materials, conductive additives, polymers, and organic solvents to create a slurry that is pasted onto a metal substrate, dried in an oven, and cut into pieces for use in batteries. The solvents are recovered through distillation.

The researchers' process, in contrast, involved mixing together dry powders, that were electrically charged so they would adhere, when sprayed onto a metal substrate. The dry-coated electrodes were then heated and compressed with rollers. Skipping the conventional drying and solvent-recovery process cut battery manufacturing energy use by an estimated 47 per cent, the researchers reported.

Wang has long been focused on improving lithium-ion batteries and reducing the waste they create. He co-founded Ascend Elements, a company that is developing battery recycling technologies. Wang's electrode manufacturing work has been funded by the Department of Energy with the United States Advanced Battery Consortium LLC and the Massachusetts Clean Energy Center.

HEAD BACK TO SCHOOL



● Poornima Mhatre

Many students have been out of their classrooms for a normal summer vacation, so what *back to school* will look like after a season of no wake-up calls!

Gearing up for this year's back-to-school season means thinking about a lot more than notebooks and highlighters. It's that time of the year when schools are getting ready to re-open and begin the new academic session. While all will make a fuss about going back to the school routine, it is this

'same school routine' that gives them the much needed focus and stability that we all long for. So, how do we go about preparing for this return?

Here is what one school enthusiast has to say about rejoining classes and friends. "The day began with one thought, 'Where is my uniform?' From brushing my teeth to tying the shoelaces, I was in a constant rush. My mother wanted to know what I would like to take for school lunch but I could only think of how soon I could reach school and meet my friends

and teachers. Everything seemed the same yet different. The teachers were welcoming as they had missed us, too. Chocolates were distributed among students as a welcome-back gift. Copying from the whiteboard, sneaking out of the classroom, falling asleep in the last period, I could relive all these moments that had become memories. To sum up the day, it was a good one, but also a tiring one."

For the child who is going to school for the first time, parents have a very special role to play. Most children have gone to a playschool or nursery and are happy to go to a big school. While there is excitement, there is also nervousness. The playschool, next door, is small, and with fewer kids. Going in a school bus to school, that is huge and with many children, can unnerve a child. So, prepare your child for that. If possible, take him/her a few times to the school, maybe after school hours or, if permitted, during daytime. Let them have a tour of the school, canteen, washroom or playroom etc. so that they are familiar with the surroundings. Fill the child with the 'fun' component of being in a big school. Schools, these days, do allow for these sorts of visits, and usually permit parents to travel in the bus for the first couple of days.

The key to getting through all this is as much preparation as possible, surveys say. That includes setting up play dates to ease kids into seeing more friends again, encouraging family discussions about feelings, and seeking out help when mood changes and elevated anxiety levels are affecting a child's ability to engage in everyday life.

Here, one educationist shares her advice for families entering a phase of uncertainty.

Q. What can parents start doing right now to help prepare for this transition?

A. I'd really like to see families making time everyday for a check-in just to see how things are going. During that time, we put our electronics down and we really just listen and pay attention. We're not asking a whole bunch of questions. We're not looking for an answer necessarily. Just, 'How are you feeling?' And then, let our kids kind of guide us from there.

Q. What kinds of responses should parents be looking out for?

A. If the child says, "I don't want to go to school anymore," then, it's definitely the time to unpack that and just talk about it.



SCHOOL

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Second Half of the Year Day

July 1st (the 182nd Day of the Year) marks Second Half of the Year Day, a chance to step back, evaluate your year so far with your goals and objectives (never mind the new year's resolutions which likely didn't last until February...), and to take action to get back on track, if necessary. It's a great opportunity to do some hard thinking over your finances, your diet, your career and other aspects of your life that you might want to improve. Make the second half of the year count!



#INTERTWINED

Romancing Health-care with Music

Music has also its own sublime romanticism in healing neurological, physical and other ailing patients



Ranjan Das Gupta
(Kolkata based freelance who writes about health-care, education, arts and culture for 3 decades.)

George Fredrick Handel, the legendary composer once said, "The essence of music has a silent romance with healthcare, which is rarely known."

No wonder Florence Nightingale always sang, "Sing them over to me again, wonderful words of life" and treated countless patients. The immortal song of Lord Jesus Christ was her inspiration for healthcare.

Great healthcare activists believe in music "which is soul seaching" and has that link with healing patients. No wonder, dazzling beauties like Sangita and Preetha Reddy, Anna Pulimood and Nandini Duggal, who are experts in the arena of healthcare, have one common link. They are all married to their first love, benevolent healthcare. Be it caring for rural healthcare development, hospital management, research in microbiology or anaesthesia related treatment, they silently excel.

The music of healthcare cannot be defined in words. If there are healthcare professionals, who are busy chasing flowers like Neil



Diamond, others are like Dean Martin's, *The Man Who Plays the Mandolin*, who give their lives serving the cause of medical excellence without caring for themselves. Indian Medical Association has recently come out with statistics of around two thousand noble medical practitioners who gave their lives during Covid.

No song in India is there to glorify their achievements. Yet, one number does do justice to them, 'My Friend the Sea' by Nana Muscouri. Her friend was the Mediterranean Sea and the friends of those valiant health warriors are medicines, surgical instruments and various equipment for healthcare development. Music has also its own sublime romanticism in healing neurological, physical and other ailing patients. Researchers around the world show us that somber Indian classical music and the lit of western philharmonic orchestras have had considerable healing effects on patients. In a rare case, *The Moonlight Sonata* helped in healing a patient at Amsterdam, Holland. He was suffering from depression.

Going by the common ways of judgement, the romanticism of music in pertinence to healthcare is calculating on the hypothetical. Maximum people believe that these are hardcore subjects which can never be linked by stupid lover oriented views. What they fail to understand is that a typical love affair of a modern-day Romeo or Don Juan has no place in the dictionary of serene love. So, the ethics



of romanticism, which is an extension of classicism, is divine and has itself created the link between healthcare and music as Ustad All Akber Khan said after his joint concert with Yehudi Menuhin.

To point out songs categorically, which relate to healthcare and ignite romanticism, is really difficult. When Dr. R. V. Asokan takes his mission of eradicating tuberculosis all throughout the nation, he receives support from the Union Government and WHO. A colon cancer patient, Dr. B. P. Reddy never misses the chance to teach students about salient features of modern healthcare and how it can fill them with a romanticism, which is not defined easily. Dr. Sandip Budhiraja, iconic General Medicine Specialist, never retorts sharply if christened, Dr. Intelligence.

These are rare examples in India where the music of healthcare can be heard. It is silent, flowing like a stream of reason and can be defined by one Pat Boone song, *Tell Me Quando*. The Spanish word for 'love' in this song is the first line of both medical practitioners and other human beings to define their holy relation.

No wonder, the inspiration of music, in giving a new dimension to healthcare, has Dr. Johnrose Austin Jayalal silently carrying out his noble mission for Commonwealth Medical Association. The motto of a *philharmonic orchestra* mingled with *classical ragas* is the inner soul of his work.



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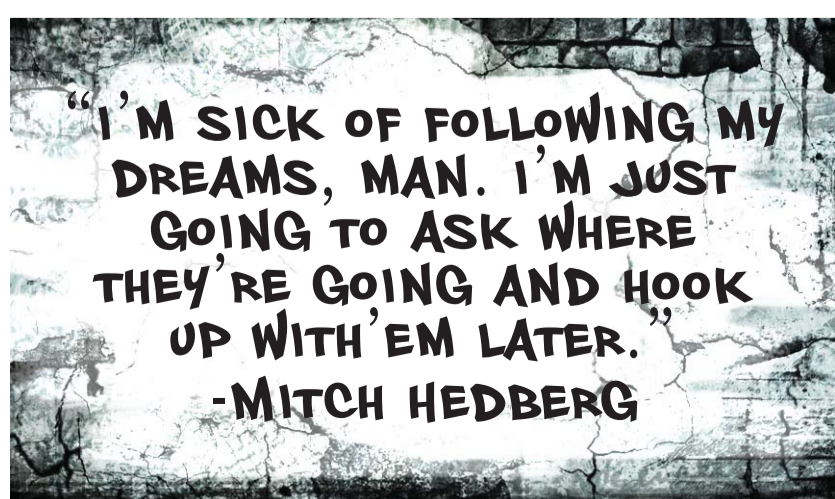
And there's thinking about the organization piece, and practicing what that's going to look like. Our kids aren't going to be sitting at home, with all those textbooks ready for them. They're going to be balancing getting to their classrooms and changing classes. Let's set a timer, see how long it will take them to get from this class to that class, and make sure that they have time to use the restroom.

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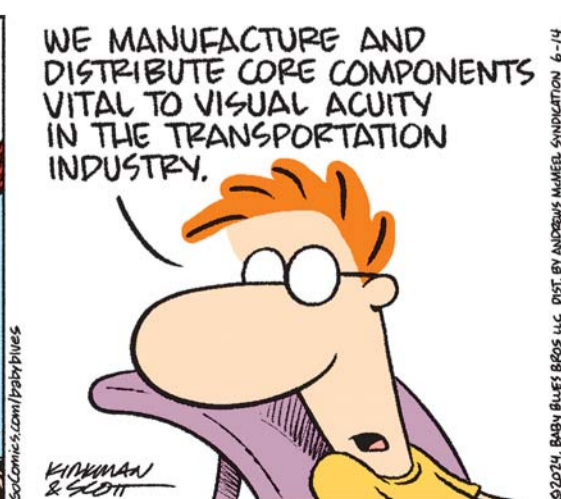
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THE WALL



BABY BLUES



By Rick Kirkman & Jerry Scott

ZITS



By Jerry Scott & Jim Borgman

