



## MARUTI INFRASTRUCTURE LIMITED

03<sup>rd</sup> July, 2024

To,  
**BSE Limited**  
Listing Department  
Phiroze Jeejeebhoy Tower,  
Dalal Street, Mumbai – 400 001

**Security Code: 531540**

Dear Sir/Madam

**Sub: Newspaper Advertisement - 30<sup>th</sup> Annual General Meeting through Video Conferencing / Other Audio Visual Means (VC/ OAVM) facility:**

Please find enclosed herewith copies of the newspaper advertisement published in Free Press Gujarat (English edition) and Lokmitra (Gujarati edition) on 03<sup>rd</sup> July, 2024, informing about the 30<sup>th</sup> Annual General Meeting of the Company to be held on Monday, 29<sup>th</sup> July, 2024 through Video Conferencing / Other Audio Visual Means (VC/OAVM).

You are requested to please take the same on record.

Thanking you,

Yours faithfully,  
**For, Maruti Infrastructure Limited**

**Alfez Solanki**  
**Company Secretary & Compliance Officer**

**Encl:** As above

## Beyond the Five Senses: Scientists Uncover Tactile Connection of Time

Sensory experiences and the perception of time are intricately linked within the somatosensory cortex of the brain. Here, the neural representations for both sensations are intertwined, being "multiplexed" within a shared neural network.

Time is felt, seen, and heard, yet there are no specific sensory receptors dedicated to perceiving time, unlike those for touch, sight, hearing, and smell. This fact has long tantalized neuroscientists with the possibility that sensing time might "piggyback" on true sensory modalities. New research in fact demonstrates that the percept of time embodied within a tactile experience is rooted in the dual functionality of the somatosensory cortex.

Professor Mathew Diamond and his SISSA research team recently published their findings in *Nature Communications*, shedding light on the intricate interplay between the sense of touch and the sense of time.

As we process stimuli received through the skin, neurons in the somatosensory cortex robustly represent the detailed features of the stimuli, culminating in the subjective experience of touch. However, was the stimulus brief or extended in time? How does the perception of elapsed time emerge? The research team's results indicate how the somatosensory cortex contributes to the perception of time.

Utilizing optogenetics, a technique enabling the modulation of neuronal activity through application of light to the cortex, the study established a connection between two seemingly distinct experiences – the "what" and the "how long" of a stimulus. In rats trained to assess vibration intensity while disregarding duration,



optogenetic intervention influenced perceived intensity.

Conversely, in animals trained to evaluate vibration duration while disregarding intensity, optogenetic intervention influenced perceived duration. These findings not only affirm the expected function of the somatosensory cortex in constructing the tactile sense but also support the notion that the perception of time is rooted in a widespread network of brain areas with diverse functions, including touch. This research lays the foundation for future studies exploring the intricate relationship between sensory experiences and the perception of time.

"The neuronal mechanisms underlying the perception of the duration of sensory events are still not fully known," explains Professor Mathew Diamond, the research coordinator. "It is believed that, rather than relying on a single dedicated brain center, the perception of time emanates from networks of neurons distributed across various brain regions. The study's findings demonstrate that the sensory processing stage of cortex is one component of the network. This means that one population of cortical neurons can give rise to two distinct sensory experiences, emphasizing the

interconnected nature of time perception and touch."

Previous work by the SISSA research group hinted at the integration and accumulation of impulses in the sensory processing pathway as a potential mechanism underlying time perception. Now, optogenetic techniques were employed to test this hypothesis directly, enabling the manipulation of neuron activity at a specific target location. Diamond explains: "If there is a behavioral effect of optogenetic intervention, the only explanation is that the target neurons are somehow involved. Targeting similar sets of neurons in the two groups of rats produced two different outcomes in their behavior. Increasing neuronal firing by optogenetics increased the perceived duration in the 'duration' rats and increased the perceived intensity in the 'intensity' rats. Since both percepts involve an overlapping set of neurons, we describe the two signals as 'multiplexed' in the somatosensory cortex. As a final step, we constructed a mathematical model that goes from the physiology of cortical neurons to the final percept. The model points to potential cellular mechanisms for building elaborate percepts from neuronal firing."

## Engineering the Unbreakable: MIT's Microscopic Metamaterials Defy Supersonic Impacts

An intricate, honeycomb-like structure of struts and beams could withstand a supersonic impact better than a solid slab of the same material. What's more, the specific structure matters, with some being more resilient to impacts than others. That's what MIT engineers are finding in experiments with microscopic metamaterials — materials that are intentionally printed, assembled, or otherwise engineered with microscopic architectures that give the overall material exceptional properties. In a study published recently in the *Proceedings of the National Academy of Sciences*, the engineers report on a new way to quickly test an array of metamaterial architectures and their resilience to supersonic impacts.

In their experiments, the team suspended tiny printed metamaterial lattices between

microscopic support structures, then fired even tinier particles at the materials, at supersonic speeds. With high-speed cameras, the team then captured images of each impact and its aftermath, with nanosecond precision.

Their work has identified a few metamaterial architectures that are more resilient to supersonic impacts compared to their entirely solid, nonarchitected counterparts. The researchers say the results they observed at the microscopic level can be extended to comparable macroscale impacts, to predict how new material structures across length scales will withstand impacts in the real world.

"What we're learning is, the microstructure of your material matters, even with high-rate deformation," says study author Carlos Portela, the Brit and Alex d'Arbeloff

Career Development Professor in Mechanical Engineering at MIT. "We want to identify impact-resistant structures that can be made into coatings or panels for spacecraft, vehicles, helmets, and anything that needs to be lightweight and protected."

Other authors on the study include first author and MIT graduate student Thomas Butruille, and Joshua Crone of DEVCOM Army Research Laboratory. The team's new high-velocity experiments build off their previous work, in which the engineers tested the resilience of an ultralight, carbon-based material. That material, which was thinner than the width of a human hair, was made from tiny struts and beams of carbon, which the team printed and placed on a glass slide. They then fired microparticles toward the material, at velocities exceeding the speed of sound.

## More Intelligent Than Previously Thought – Scientists Uncover Surprisingly Sophisticated Neanderthal Construction

A team of researchers has found that Neanderthals crafted stone tools using a sophisticated multi-component glue. This discovery, the oldest known example of such an advanced adhesive in Europe, indicates that these early human relatives possessed a greater degree of intellectual and cultural sophistication than was earlier believed.

The work, reported in the *Journal of Archaeological Science*, included researchers from New York University, the University of Tübingen, and the National Museums in Berlin.

"These astonishingly well-preserved tools showcase a technical solution broadly similar to examples of tools made by early modern humans in Africa, but the exact recipe reflects a Neanderthal 'spin,' which is the production of grips for handheld tools," says Radu Iovita, an

associate professor at New York University's Center for the Study of Human Origins. The research team, led by Patrick Schmidt from the University of Tübingen's Early Prehistory and Quaternary Ecology section and Ewa Dutkiewicz from the Museum of Prehistory and Early History at the National Museums in Berlin, re-examined previous finds from Le Moustier, an archaeological site in France that was discovered in the early 20th century.

The stone tools from Le Moustier—used by Neanderthals during the Middle Palaeolithic period of the Mousterian between 120,000 and 40,000 years ago—are kept in the collection of Berlin's Museum of Prehistory and Early History and had not previously been examined in detail. The tools were rediscovered during an internal review of the

collection and their scientific value was recognized.

"The items had been individually wrapped and untouched since the 1960s," says Dutkiewicz. "As a result, the adhering remains of organic substances were very well preserved." The researchers discovered traces of a mixture of ochre and bitumen on several stone tools, such as scrapers, flakes, and blades. Ochre is a naturally occurring earth pigment; bitumen is a component of asphalt and can be produced from crude oil, but also occurs naturally in the soil. "We were surprised that the ochre content was more than 50 percent," says Schmidt. "This is because air-dried bitumen can be used unaltered as an adhesive, but loses its adhesive properties when such large proportions of ochre are added."

# Scientists Develop Method To Cool One of the World's Hottest Cities by 8°F

A recent study from UNSW Sydney demonstrates that significant reductions in the temperatures of major cities located in hot desert climates can be achieved alongside decreases in energy expenses.

The findings, recently published in *Nature Cities*, detail a multi-faceted strategy to cool Saudi Arabia's capital city by up to 4.5°C, combining highly reflective 'super cool' building materials developed by the High-Performance Architecture Lab with irrigated greenery and energy retrofitting measures. The study, which was conducted in collaboration with the Royal Commission of Riyadh, is the first to investigate the large-scale energy benefits of modern heat mitigation technologies when implemented in a city.

"The project demonstrates the tremendous impact advanced heat mitigation technologies and techniques can have to reduce urban overheating, decrease cooling needs, and improve lives," says



UNSW Scientia Professor Mattheos (Mat) Santamouris, Anita Lawrence Chair in High-Performance Architecture and senior author of the study.

Prof. Santamouris specializes in developing heat mitigation technologies and strategies to decrease urban temperatures in cities. Extreme urban heat affects more than 450 cities worldwide, increasing energy consumption

and adversely impacting health, including heat-related illness and death. Riyadh, the capital of Saudi Arabia, is one such city. Situated in the center of a desert, it is one of the hottest cities in the world, with temperatures that can exceed 50°C during summer. Furthermore, climate change and rapid urbanization are increasing the magnitude of

overheating. "Limited greenery and large artificial surfaces made of conventional building materials like asphalt and concrete trap heat, meaning the city continues to heat up," says Prof. Santamouris. "Additional heat from car pollution and industrial activities also increases the city's temperature."

Simulating city-scale heat mitigation scenarios

For the study, the team led by UNSW researchers ran large-scale cooling climatic and energy simulations of the Al Masiaf precinct of Riyadh, including the energy performance of 3323 urban buildings, under eight different heat mitigation scenarios to evaluate optimal strategies for lowering the temperature of the city and reducing cooling needs.

The modeling, which considered different combinations of super cool materials, vegetation types, and energy retrofitting levels, found it's possible to decrease the outdoor temperature in the

city by nearly 8.1°F (4.5°C) during summer. The strategy would also improve cooling energy conservation for the city by up to 16 percent.

The recommended heat mitigation (or cooling) scenario for Riyadh includes using super cool materials implemented in the roof of the buildings and more than doubling the number of irrigated trees to improve transpiration cooling. On the contrary, a blind implementation of urban cooling techniques not based on detailed and advanced scientific optimization, like the use of non-irrigated greenery, may result in a substantial increase in the city's temperature.

"By implementing the right combination of advanced heat mitigation technologies and techniques, it is possible to decrease the ambient temperature at the precinct scale," says Prof. Santamouris. "For a sweltering city the size of Riyadh, significantly reducing cooling needs is also tremendous for sustainability."

## Scientists Discover Unconventional Method To Easily Improve Wine Quality

The market is showing a growing interest in carbonic maceration wines. These are youthful red wines characterized by dominant floral and fresh fruit scents, and they are best enjoyed within their first year. The most famous of these wines is France's Beaujolais nouveau. However, similar traditions exist in La Rioja and Catalonia, particularly in the Montsant region and the Conca de Barberà. Research by the URV has found that the quality of these wines can be increased by using an unconventional yeast that considerably improves their organoleptic properties and speeds up the malolactic fermentation process. This effect has also been found in orange and rosé wines. Carbonic maceration is a winemaking technique that consists of three phases. In the first, whole grapes are placed in vats full of carbon dioxide to create an oxygen-free atmosphere that leads to alcoholic fermentation inside the grains. When this fermentation takes place, many odors are released and the resulting wines have very fruity aromas, of banana and red fruits. After a few days, in the second phase, the macerated grains are pressed to complete the alcoholic fermentation. And in the third and last phase, malolactic fermentation is induced by the lactic acid bacteria in the wine.

For the first time, a research team from the URV's Biochemistry and Biotechnology Department has studied the effects of the *Torulaspora delbrueckii* yeast on carbonic maceration wines, rosé wines, and orange wines. "Previous research had focused largely on traditional wines, white and red, and we have studied other less common vinifications. In addition, we have studied not only alcoholic fermentation but the whole process, from start to finish," explains Candela Ruiz de Villa, the principal researcher of the project.

During the study, they inoculated strains of the yeast and observed what effect they had on the organoleptic characteristics and the process of malolactic fermentation, which occurs after alcoholic fermentation, reduces acidity, and adds complexity, smoothness, and stability. The wines resulting from this process of inoculating *Torulaspora delbrueckii* in the first phase have been quite striking: "The carbonic maceration wines inoculated with this yeast had a much more intense color than those inoculated with spontaneous yeasts, because the anthocyanins, the compounds that give color to red wine, were conserved," adds Candela Ruiz de Villa. The researchers also observed an increase in some aroma families such as banana, which is the main one in these wines.

## New Research Reveals That Happiness Isn't Expensive

Many Indigenous peoples and local communities around the world are leading very satisfying lives despite having very little money according to new research from the Institute of Environmental Science and Technology at the Universitat Autònoma de Barcelona (ICTA-UAB). The study reveals that several communities with low monetary incomes experience life satisfaction levels on par with those found in affluent nations. Economic growth is often prescribed as a sure way of increasing the well-being of people in low-income countries, and global surveys in recent decades have supported this strategy by showing that people in high-income countries tend to report higher levels of life satisfaction than those in low-income countries. This strong correlation might suggest that only in rich societies can people be happy. However, a recent study conducted by ICTA-UAB in collaboration with McGill University in Canada suggests that there may be good reasons to question whether this link is universal. While most global polls, such as the World Happiness Report, gather thousands of responses from the citizens of industrialized societies, they tend to overlook people in small-scale societies on the fringes, where the exchange of money plays a minimal role in everyday life and livelihoods depend directly on nature. The



research, published in the scientific journal *Proceedings of the National Academy of Sciences (PNAS)*, consisted of a survey of 2,966 people from Indigenous and local communities in 19 globally distributed sites. Only 64% of surveyed households had any cash income. The results show that "surprisingly, many populations with very low monetary incomes report very high average levels of life satisfaction, with scores similar

to those in wealthy countries," says Eric Galbraith, a researcher at ICTA-UAB and McGill University and lead author of the study. The average life satisfaction score across the studied small-scale societies was 6.8 on a scale of 0-10. Although not all societies reported being highly satisfied – averages were as low as 5.1 – four of the sites reported average scores higher than 8, typical of wealthy Scandinavian countries in other polls.

## Edge of History: How an Obsidian Blade Rewrites the Trail of Conquistadors

It's a small piece of obsidian, just over 5 centimeters long, likely found on a hard-scrabble piece of ranchland in the Texas panhandle. But when SMU anthropologist Matthew Boulanger looks at it, he gets a mental image of Spanish explorer Francisco Vasquez de Coronado making his way across the plains more than 470 years ago in search of a fabled city of gold.


Boulanger believes that the flaked-stone tool with its sharp edge was likely dropped by a member of Coronado's expedition, which included people indigenous to Mexico, as they trekked across parts of Texas, New Mexico, Arizona, Oklahoma, and Kansas. His theory is backed by spectrometer analysis of the blade's chemical composition, which ties it to Central Mexico's Sierra de Pachuca mountain range, where indigenous people used obsidian to produce cutting tools until the Spanish conquest.

"This small unassuming artifact fits all of the requirements for convincing evidence of a Coronado presence in the Texas panhandle," said Boulanger. "It is the correct form of artifact, it is fully consistent with other finds, the correct material, found in the correct location, and there are no indications of an intentional hoax."

Boulanger, director of the Archeology Research Collections in SMU's Dedman College of Humanities and Sciences, published his findings in the *Journal of the North Texas Archeological Society*, with co-author Charlene Erwin. Other researchers have traced the path of Spanish explorers and indigenous people from Mexico across what is now the United States through the presence of central Mexican obsidian blades; because the blades were brittle, they were discarded along the way as they broke. Boulanger concedes that where the blade was found is

subject to conjecture, as he examined the artifact after the death of its collector. But a reconstructed map of Coronado's expedition shows that the travelers likely passed by or through the ranch near McLean Texas where collector Lloyd Erwin grew up.

As a child, Erwin became interested in historical artifacts and started collecting items he found on the ranch. Years later, his daughter-in-law, Charlene, asked Boulanger to authenticate some of the obsidian pieces in a collection of artifacts that he had framed. Upon closer examination, Boulanger noticed a greenish tint to an obsidian piece that looked like it had been placed in the frame as an afterthought. Using a spectrometer, Boulanger traced the obsidian to Central Mexico's Sierra de Pachuca mountain range, where indigenous people widely used obsidian to produce tools until the Spanish Conquest.



**MARUTI INFRASTRUCTURE LIMITED**

**NOTICE TO SHAREHOLDERS**

Notice is hereby given that the 30th Annual General Meeting ("AGM") of Maruti Infrastructure Limited (the "Company") will be held through Video Conferencing or Other Audio Visual Means ("VC/OAVM") on Monday, 29th July, 2024 at 11:45 a.m pursuant to the applicable provisions of the Companies Act, 2013 and Rules framed thereunder read with General Circular No. 20/2020 dated 5th May, 2020, circular no 02/2021 dated 13th January, 2021, 02/2022 dated 05th May 2022, 10/2022 dated December 28, 2022 and latest being 09/2023 dated 25th September, 2023 issued by Ministry of Corporate Affairs (MCA) and SEBI vide its Circular No. SEBI/HO/CFD/CMD1/CIR/P/2020/79 dated 12th May, 2020, circular no SEBI/HO/CFD/CMD2/CIR/P/2021/11 dated 15th January, 2021 and SEBI/HO/CFD/CMD2/CIR/P/2022/ 62 dated 13th May, 2022, SEBI/HO/CRD/POD-2/P/CIR/2023/4 dated 5th January, 2023 and SEBI/HO/CFD/CFD-POD-2/P/CIR/2023/167 dated 7th October, 2023 allowed the Companies to hold AGM through Video Conferencing or Other Audio Visual Means ("VC/OAVM") without physical presence of the member at a common venue to transact the business set forth in the 30th AGM Notice. In view of the above and in compliance with the applicable provision of the Companies Act, 2013 and above mentioned circular, the 30th AGM of the Company will going to be conducted through VC/OAVM and physical attendance of Members to AGM venue is not required. The Members can attend and participate in the AGM through VC/OAVM.

In compliance with the above circulars, the AGM Notice alongwith the Annual Report for the financial year 2023-24 will be sent through email to the members whose email addresses are registered with the Company/RTA/ Depository Participants.

The AGM Notice alongwith the Annual Report for the Financial year 2023-24 will be made available on the Company's website at [www.marutinfra.in](http://www.marutinfra.in) and on the Bombay Stock Exchange website at [www.bseindia.com](http://www.bseindia.com).

Members who have not yet registered their email address with the Company/ Depository Participant/RTA can obtain the Notice of AGM and Annual Report and login details for attending AGM through VC/OAVM including e-voting by sending the following documents to the Company's RTA Link Intime India Private Limited on [ahmedabad@linkintime.co.in](mailto:ahmedabad@linkintime.co.in) and also to the Company on [maruti\\_infra@yahoo.com](mailto:maruti_infra@yahoo.com):

(a) For Physical Shareholders: Send duly signed request letter mentioning the name of Members, Folio no., Mobile No., Email id, copy of Share Certificate (Front and Back), self attested copy of PAN Card.

(b) For Demat Shareholders: Send duly signed request letter mentioning the name of Member, Demat account details, Email id, Mobile No.& self attested copy of PAN Card.

Members holding shares in Physical Mode are requested to register/update their email address, mobile no., correspondence address, bank details etc with the Company's Registrar and Transfer Agent (RTA) Link Intime India Private Limited at Ahmedabad office and shareholders holding shares in Dematerialized mode are requested to register/update the above details with their Depository Participant.

The manner of voting through remote e-voting or through the e-voting system during the AGM for Members will be provided in the AGM Notice. In case of any queries on the above matter, Members of the Company may contact us on the email id and telephone nos. mentioned above.

**For, Maruti Infrastructure Limited**  
**SD/-**  
Date: 2nd July, 2024 **Aifex Solanki**  
Place: Ahmedabad **Company Secretary & Compliance Officer**

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