KOTELEO

Sequestration Technologies

INCUBATOR

carbon sequestration cohort.

The IIT Alumni Incubator's Carbon Sequestration Initiative is the foundation of the Sustainable Materials Platform (SMP) under the Forum mission. The initiative which is housed in a stealth mode startup Koteleo which takes a 360 degree view of carbon sequestration and is considered a global authority on the subject.

IIT Alumni Incubator's Carbon Sequestration Cohort seeks to induct an industry partner:

- Led by a young thought leader who is globally exposed, educated at a premier institution and has access to the necessary resources to be an agent of change.
- With sufficient exposure in the three target areas of Forum SMP - manufacture of non corrosive metals, flexible and additive manufacturing and assembly of composites based on a metal base.
- Willing to step out of their comfort zone to work through a new entity with a culturally diverse technology team, a global market focus and widely held ownership.

We expect our industry partners to:

- Commit Rs 200 crores+ in corporate funding in the carefully defined area through a new entity devoid of any legacy and migration issues.
- Agree to the young promoter as being the only common person between the legacy enterprise and the new entity.
- Support the creation of a professionally managed, board run company which should be listed on a stock exchange within 36 months so as to reduce the holding of the sponsor corporate to below 50%.
- Structure 26% non-dilutable equity in the initiative to the IIT Alumni Incubator post IPO (26% incubator, 26% public, 48% industry partner).

. An IIT Alumni Council initiative .

Onboarding process:

- induct the promoter as an individual patron member of IIT Alumni Council (Rs one crore donation)
- induct the corporate member as a patron member of the IIT Alumni Council (Rs two crore donation)
- fuel a Koteleo downstream entity to create manufacturing capability for carbon fibre, carbon nanotubes and graphene (Rs two hundred crore+ funding commitment from the sponsor)

image credit . valeria miller | via canva

KOTELEO

Carbon Sequestration as a key technology for planetary remediation.

The Koteleo initiative is a fifteen year technology mission (2013-28) to solve technical and economic challenges for carbon sequestration at global scale by converting the green house gases - carbon dioxide and methane - into useful and valuable products. The company is on its path to delivering the first set of disruptive technologies next year.

The five key technologies being pursued by Koteleo are:

- capture of carbon for direct infusion in soil to improve plant yield.
- conversion of coal and natural gas into activated carbon which is then converted into graphene using the flash joule process.
- chemical vapour deposition process for the controlled production of carbon nanotubes
- conversion of petroleum waste into isotropic carbon fibres which have superior rigidity and lower cost compared to PAN based fibres (whose production generates toxic byproducts)
- production of low cost green hydrogen using carbon electrolysers.

Koteleo proposes to set up a downstream entity for capability building and demonstration with an industry partner at an indicative capital investment of upto Rs 200 crores using the format of an independent and autonomous, professionally-managed, board-run company.

Leading the Change !!

In 2020, India announced a major internal and global initiative to lead in the areas of sustainability and climate change. Global imperatives are such that governments around the world will have to tax the polluters and subsidise the remediation facilitators. ESG is taking centre-stage in the corporate world as public capital forsakes the perpetrators of the climate crisis.

The Forum Sustainable Materials Platform currently comprises of three non-profits which are driving inflective change in the core areas of energy, transportation and infrastructure :

- Forum Mission of IIT Alumni Council
- Koteleo initiative of IIT Alumni Council
- Ayushca initiative of IIT Alumni Council

The Forum Carbon Resilience Platform is a complementary platform which assesses projects not just from a green house gas emission perspective but also from the perspective of human health and climate resilience. The CRP is a consortium of:

- Forum Mission of IIT Alumni Council
- Development Alternatives and ZERI
- Peermade Development Society and Wellness Lifestyle Foundation.

Contact us

to join the consortium

a movement.

needs many
new players.

who work to a
common goal.

image credit . peopleimages-yuriarcurs | via canva

Being built like

A Movement !!

Koteleo has been designed not as a business, but as a movement. A truly inclusive movement which welcomes credible new partners to join its ranks. Partners can contribute time, resources or funding. Activities of our partner organisations are supported by some of the largest and most credible impact funding organisations in the world and include the MegaFund of the IIT Alumni Council (India's largest social impact fund under the AIF Regulations of SEBI) and the CSR initiatives of some of the most admired corporations.

The Koteleo initiative welcomes as active members

Global Corporate Leaders engaged in the production of sustainable non-corrosive advanced materials

Startups working in this space

New Players willing to invest in the area of flexible and additive manufacturing using the advanced materials.

Contact us

to join the consortium

1

Non-profit initiative in pursuing global scale carbon sequestration

The initiative has been designed ground up to convert sequestered carbon into valuable and useable products which can replace and substitute products which add to green house generation and global warming

5+

Sustainability technologies clearly identified

Koteleo has identified 5+ clear technologies, each of which have massive global potential for cost effective and commercially viable sequestration.

25+

Global technologists, innovators & venture capitalists as backbone

All of whom are alumni of the prestigious Indian Institutes of Technology. Assisted by 10,000+ interns from the Alumni Next Platform.

100+

Scaleable incubation platform that expands on-demand

Our 10,000 sqm incubator space in the National Capital Region of India to support 5+ downstream ventures over the next three years with a single

Transition requirements

- accurate identification of options
- viability of by product
- appropriate technology options
- capital goods and process
- getting suitable standards/modifications in place

has been built ground-up to help the startups to achieve this functionality.

Mission Mode

The IIT Alumni Incubators carbon sequestration initiative - a global change implementing initiative - will function as a mission. Structured like a movement rather than a business, the boundary between clients and experts will be a fluid and ever-evolving one. As more and more clients engage with the platform, the cumulative expertise of the platform keeps growing exponentially.

1

Self Learning

Forum collects and collates information for Koteleo like an open-source platform. We do not seek any confidential information, nor is any of our expertise confidential. By optimally utilising technology and human expertise, we have been able to create an initiative that relies on crowdsourced information for self-learning. This eliminates the need for working with pre-formulated hypotheses or judgmental opinions. By involving hundreds of subject matter experts from around the globe, we are able to curate the needle from the haystack without getting lost in the detail.

2

Pre-implementing

Forum has realised that radical change involves inordinately long cycle times. The chicken and egg situation between demand and supply can stifle innovation and slow down the pace of change. The only way around this is to create a ready customer before the product is manufactured. This involves making financial commitments of a massive scale in ventures that pre-agree to buy and deploy products which may not have adequate track record of performance.

The pre-implementing projects in the area of graphene from coal, fibre from petroleum waste and nanotubes by vapour deposition is rapidly gaining expertise and databases. Ready customer pilots in the areas of energy, transportation and habitats have been identified by choosing applications which dont require new standards to be put in place.

3 Avoiding the subsidy loop

There is nothing financially attractive about climate change opportunities. Whether it is electric buses, solar energy or sustainable habitats - all of these require both public policy support as well as subsidies. Subsidies are limited by budgets. Our objective is to innovatively fund viability gaps without relying on tax payer funded subsidies.

4 Physical meets digital

The advanced materials from Koteleo are being emulated in digital avatars primarily for use in the digital plane. This is what makes it disruptive. In cyber physical systems, physical and software components are deeply intertwined, able to operate on different spatial and temporal scales, exhibit multiple and distinct behavioural modalities and interact with each other in ways that change with context.

5 Single window for end user

The Koteleo initiative along with the Forum SMP strategy is to provide a single window for the end user of the composite material. The single window service offered by Forum SMP manages the entire supply chain and technical support for the end purchaser of the composite material based on metal base with carbonaceous tensile or compressive models

The cost and complexity of bespoke products continue to rise, while the supporters and depth of an open-source platform keep growing. This results in exponentially declining costs of customisation and differentiation.

By developing an ecosystem of credible and well-funded industry and technology partners, Forum SMP is able to access large infrastructure facilities as well as trained specialist manpower to help in the cost-effective and timely execution of disruptive products in the three target areas as well as in the areas of flexible and additive manufacturing where robots have to be used to make robots which then do the manufacturing directly from a digital file - with minimum damage and minimum usage of human labour.

image credit . photocreo | via canva

A ANALYSE

B BLUEPRINT

C CO-CREATE

A
ANALYSE

The first step in a remediation exercise is a detailed diagnosis of the status quo - including an assessment of carbon footprint of the products currently in use. A good example is the transition from a diesel bus to an electric bus.

B
BLUEPRINT

The second step is a detailed project report outlining a plan to initiate and sustain a transition program. This includes selection of technology partners and executing contractors. The report attempts to evaluate options that could disrupt the status quo. Example is the replacement of 12m long buses with 6m buses which run like an uber cabl.

C
CO-CREATE

The third step is the establishment of a Project Management Unit to oversee execution of the Plan. Example is the creation of PPP entities to deliver public transportation disruption.

foundational technologies, materials and paradigms.

New paradigms will require either new materials or existing materials packaged differently in combination with new materials. These materials may necessitate new processing equipment and capacities. They may also require new business models, different funding approaches and altogether new operating paradigms

1
MATERIALS

Carbon sequestration

One of the key challenges in the zero carbon paradigms is to find a use case for the sequestered carbon. Koteleo - an initiative of the IIT Alumni Council has been working for over ten years on converting carbon into three wonder materials - graphene, carbon fibre and carbon nanotubes.

2
MATERIALS

Corrosion free metals

Corroding materials such as carbon steel are inappropriate materials from a climate resilience perspective. There is considerable environmental damage from their production - and their short useable life adds to the damage. The three corrosion free metallurgical systems to be pursued are stainless steel, aluminium and alloys (including nickel, zinc and palladium)

3
MATERIALS

Composites

Corrosion free metals can be coupled with carbon sequestration products to create sandwiched panels, mesh aggregates and other formats of high strength materials. For example stainless steel members can be coupled with carbon nanotubes to make substitutes for TOR steel in infrastructure or real estate.

The three key areas likely to undergo a disruptive transformation are infrastructure and real estate, energy production and distribution, transportation and its automation.

1
APPLICATION

Infrastructure and real estate

As the implications of climate change and global warming become visible and apparent, infrastructure and habitat development strategies will need to change. People will need to live in smaller houses with air conditioning. And these houses may need to be built in a way so as to minimise environmental damage. At the same time they may need to be disaster proof.

2
APPLICATION

Energy and its distribution

Renewable power will need to be made 24/7 through the use of grid storage and other technologies. Once this is done, the cost of energy should reduce substantially leading to a massive surge in consumption. This in turn should over burden the grid, finally leading to its collapse. The rapidly reducing cost of solar power will have multiple positive spin offs including the elimination of energy poverty in the emerging countries. However, renewable power generation equipment itself will need to be manufactured sustainably.

3
APPLICATION

Transportation and its autonymi

As public transportation becomes both reliable and comfortable, the rationale for private ownership of vehicles will reduce. This will lead to the widespread availability of transportation as a service. Autonomous vehicles will further reduce cost and improve service levels.

4 guiding principles

of Koteleo Carbon Sequestration

1
PRINCIPLE

Maximize life, minimize waste

Money is the ultimate commodity. In a borderless world, all money is one. Conversion between currencies is easy. And therefore manufacturing has got concentrated in specific geographies where conniving governments, helpless workers and ruthless investors led to ill-advised pursuits of efficiency. This led to a 'use & throw economy'. Natural resources were exploited ruthlessly as was capital and labour. The circular economy which stood the test of time in ancient civilisations like India was rapidly overtaken by new technologies in the industrial age - run by capitalists in a free market economy.

Capital became more important than common sense and corporates have adequate incentives to act criminal, especially when it comes to the environment and bio-diversity.

2

PRINCIPLE

Do more with less

Traditional business growth is accompanied by both capital absorption and an increase in manpower. Often manpower is replaced with capital (automation) for increasing rates of production. India has managed to reverse this trend through three important achievements:

a) First is frugal innovation where very little capital is required for a substantial innovation.
b) Second is taking this innovation to market through non-profits so that there is no profit.
c) Third is to use an open-source ecosystem to ensure that there is no consolidation.

3

PRINCIPLE

Review economics of scale

Depending on how economics are measured, traditional measurement paradigms can often reveal incorrect results. For example, some countries may have achieved economies through the exploitation of labour and nature, further aided by hidden subsidies and misplaced incentives. This works to drive competitors out of business, further leading to a mistaken impression that the economies of scale actually exist. In some cases it even led to the global belief that concentration of marketshare was not just good for the world but also desirable to improve the quality of life.

4

PRINCIPLE

Net zero is not the goal

It is the beginning. The other goal is a fully circular economy. In addition, there is the inherent responsibility of every organization to atone for the sins of the last 200 years.

some examples.

image credit . sy | via canva

Gunter Pauli at the Captain's Cockpit of MS Porrima

The MS PORRIMA boat, named after the goddess who carries the vision of the future, is a living laboratory for cutting-edge technologies. Its aim is to provide "proof of operation", i.e. proof of the functioning of several technologies in action.

She is the first boat in the world to have circumnavigated the globe using 100% solar power, under the name Planetsolar.

MS Porrima

“MS Porrima embraces many innovations as if they were a community. The catamaran has successfully circumnavigated the globe three times, showing its preparedness at the technology level for commercialisation and widespread use in an open source format.

This experimental vessel embodies many of our favourite technologies. However, it is more than a demonstration of renewable energies, ranging from solar power (540 square meters) to artificial intelligence kites (capturing permanent wind up to 800 meters) to hydrogen made from seawater. It’s a change-maker.

These technologies are designed and continuously improved by a network of scientists who have been collaborating since 1994 within the framework of the zero-emissions philosophy and pragmatic approach to project implementation known as the blue economy.”

Gunter Pauli

āyushća was conceptualised as part of the megaLab mission of the IIT Alumni Council to meet the need for safe and healthspan-enhancing infrastructures in a post-covid age.

āyushća is a unique model that combines holistic wellness, regenerative habitats, and cutting-edge net-zero technology to support sustainable multi-generational living.

image credit | almanakken project . louis becker
via | sweco.dk/en/showroom/almanakken

luxury coaches

The luxury buses deployed as part of the network need to have a distinctive look, low cost, bespoke interiors, large glass panels, easy fast charging and low cost. They also need features like easy embarking with heavy luggage and easy disembarking for wheelchair passengers. Such buses have been developed through initiatives of the Council indigenously.

long-haul virtual metro

Conventional articulated buses used for long haul - metro or tram type applications - need a high turning radius. This may not be possible all over the State. Thus low turning radius versions of such buses would be required. Buses suitable for this application are currently under development.

mobile clinics

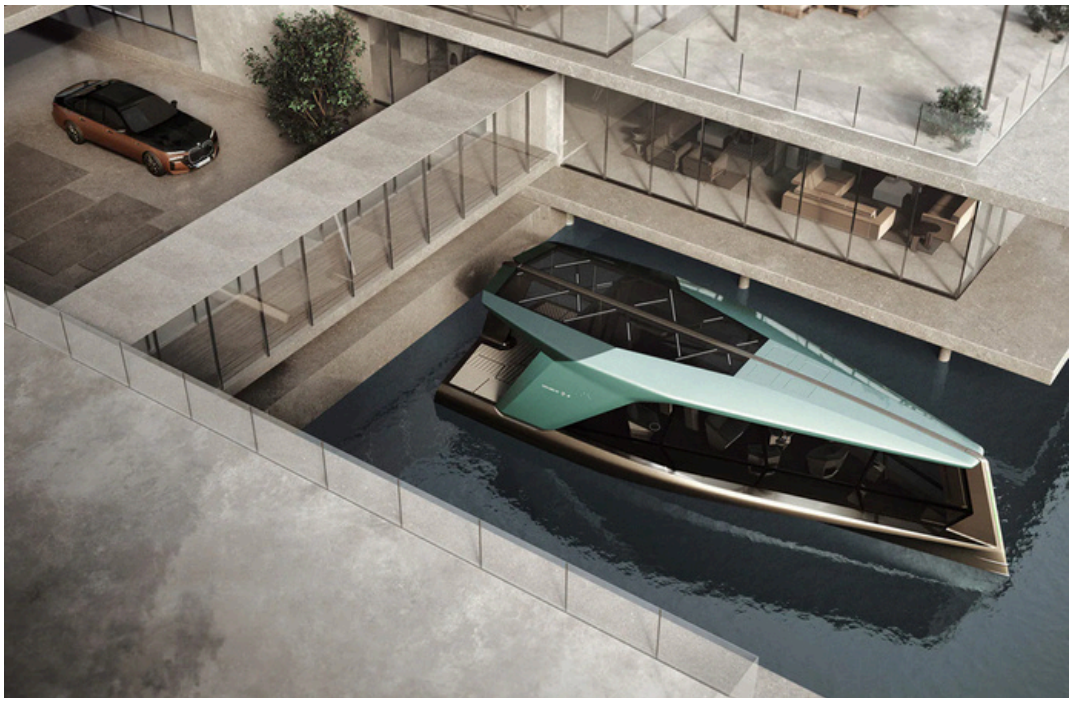
The first set of MegaLab buses were flagged off on May 1, 2020 as an emergency fleet to help manage the covid pandemic in Mumbai and other cities. The bus interiors were modelled using paradigms used by private planes refitted for medical use. The MegaLab fleet was the first electric bus to have a full function digital X-ray and RTPCR lab on board for covid testing.

Photograph of the interiors of the actual MegaLab bus,2020 version deployed at the NSCI Dome Covid hospital. It was the first covid lab bus in the world. The bus was equipped with digital radiology equipment for remote reporting via telemedicine.

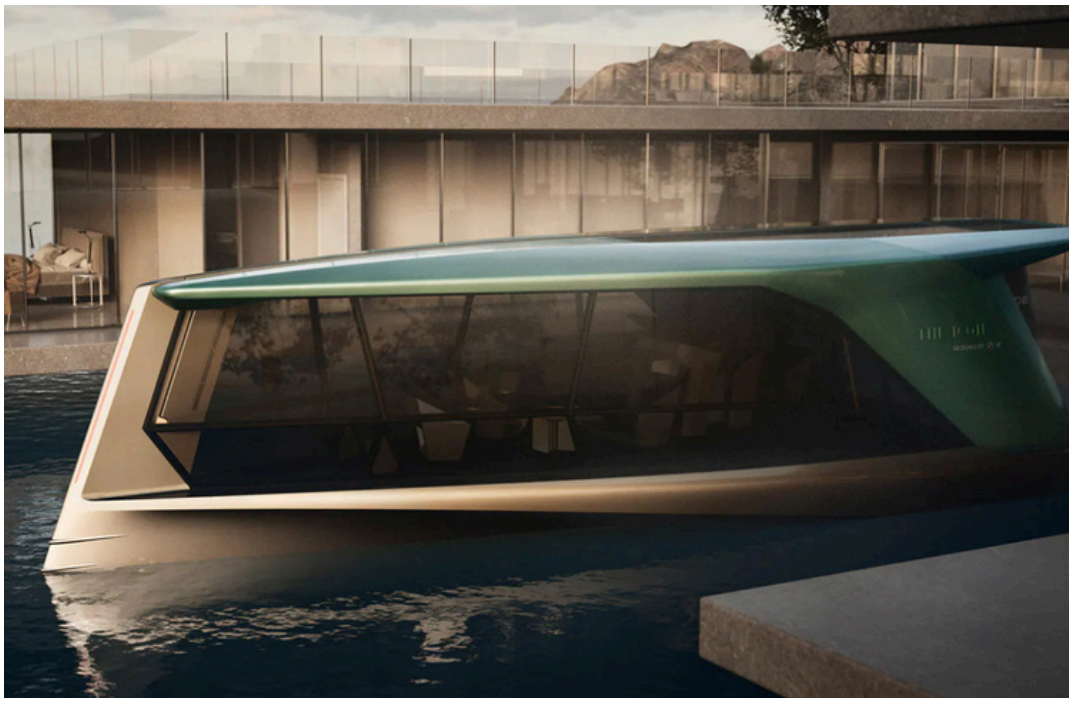
emergency response

water cruisers

It is now possible to build hydrofoil type high speed yachts. These can be built upto 20m in length and can achieve speeds upto 40 knots. Given the simplicity of design because of electric propulsion, it is possible to cost effectively manufacture these in Goa. The zero pollution boats can take luxury tourism to the next level. .



It is also possible to design jetties on water channels that are extended inland from the waterfront. This can enable waterfront establishments to host their private jetties to anchor small yachts.



Once a design is perfected, it is also possible to produce the same design in different sizes ranging from 5m to 20m in length. The power system can be further optimised using solar roofs.

contact.

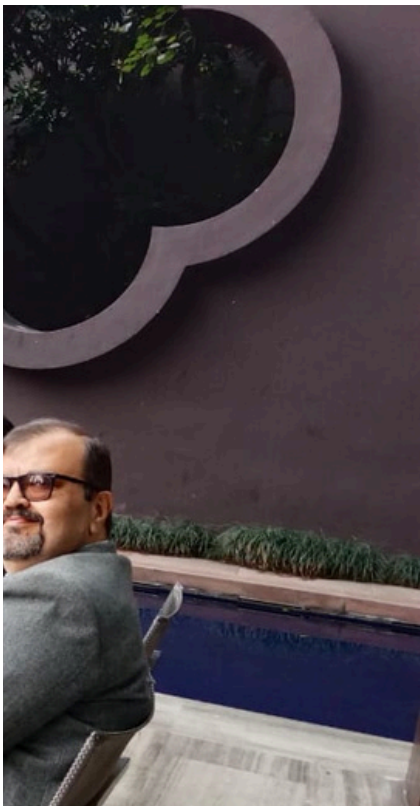
. An IIT Alumni Council initiative .

Get in touch with us for a free, no-strings-attached conversation about what Koteleo can do for you.

To ensure adequate impact and in order to focus on large initiatives, we typically look for clients with a USD 250 million or more remediation budget in a 3-4 year time frame.

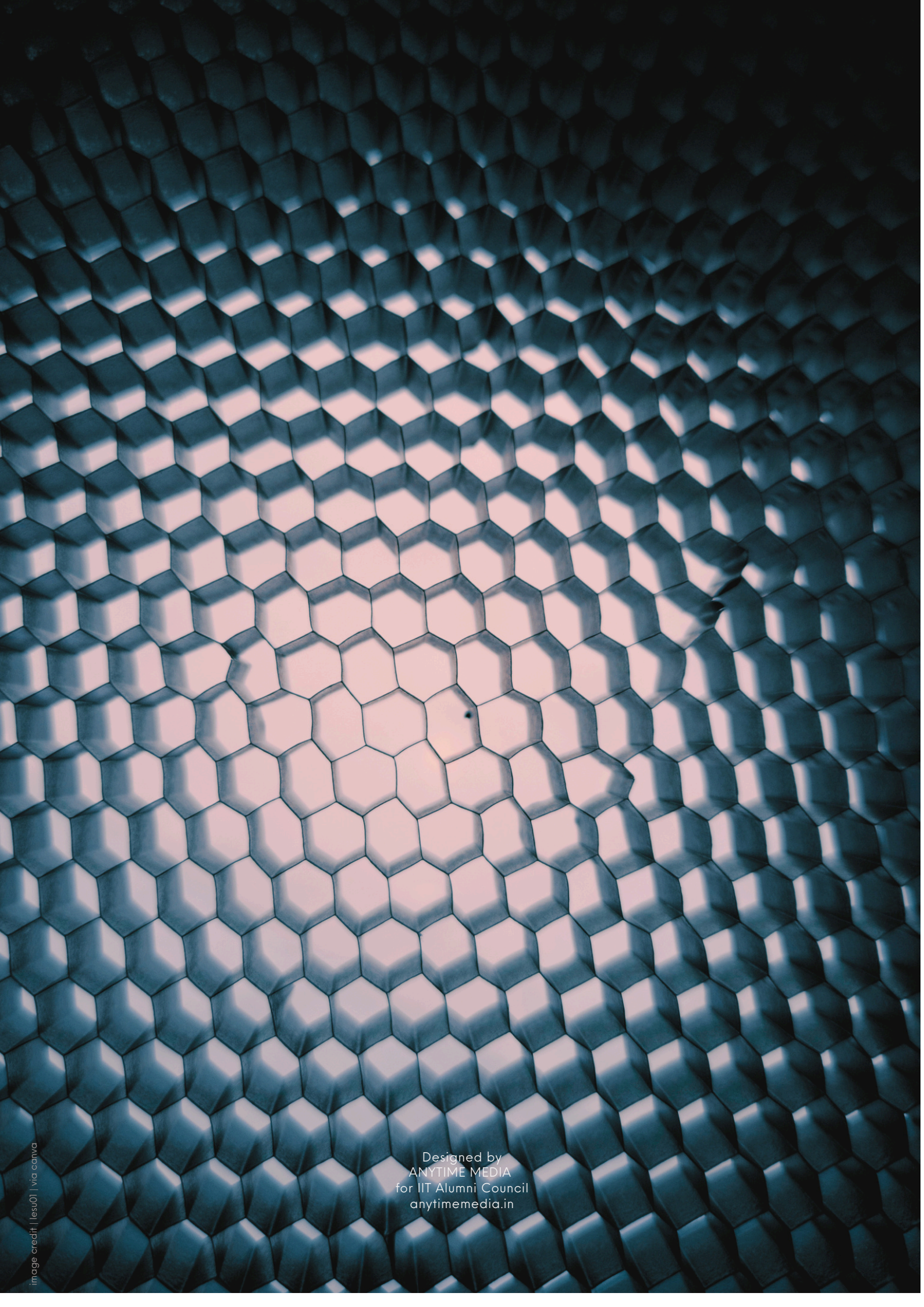
Koteleo Coordinator

Mr Satish Mehta
IIT Alumni Council/ Forum SMP
media@iitalumnicouncil.org
+91 11 35720006 +1 650 900 8833
forums.org.in



FORUM

. An IIT Alumni Council initiative .



Designed by
ANYTIME MEDIA
for IIT Alumni Council
anytimemedia.in