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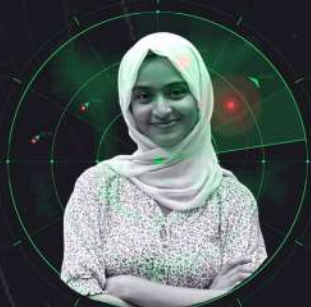
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ELECTED MEMBER



AR. MILANI M U
ELECTED MEMBER



MARYAM AFEefa MEHKRI
EDITOR

A NOTE FROM THE **CHAIRMAN**””

Dear Friends,

Wishing you all a joyous and prosperous Dussehra and Deepavali! These festivals symbolize the triumph of good over evil, strength over adversity, and wisdom over ignorance. They remind us of the courage and unity needed to overcome challenges—values that resonate deeply with our profession. As we celebrate these festivals, let us also reaffirm our commitment to stand together and face the challenges that impact our architectural community and profession as a whole.

While the Professional Civil Engineers Bill 2024 has been enacted, it brings with it certain concerns that need careful consideration. Rest assured, we have been actively engaged in meaningful discussions with the government to address these critical issues, particularly regarding the framing of the rules. Our optimism remains high, and we trust that the ongoing dialogue will result in the revisions promised by the Government. Our focus is to ensure that these changes will reflect the collective concerns of our profession and safeguard our standards of practice.

On an exciting note, I am thrilled to announce that IIA Karnataka is gearing up for one of the most anticipated events in our calendar—LATITUDE 2025, scheduled for January 24th and 25th. Following the tremendous success of LATITUDE 2022, this upcoming edition promises to be even grander, setting new benchmarks for excellence and participation.

This time, we are particularly excited to introduce the IIA KC LATITUDE AWARDS, which will recognize and celebrate architectural brilliance across 10 categories, spanning diverse aspects of architectural practice and design. The awards aim to spotlight the innovative, sustainable, and cutting-edge work being done by architects in our community. In addition, we are proud to announce three special awards dedicated to recognizing outstanding teachers from IIA-affiliated institutions who have made significant contributions to the education and nurturing of future architects. These awards will highlight the important role educators play in shaping the next generation of professionals in our field.

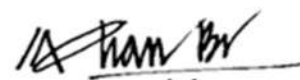
If you have not yet become a member of IIA or affiliated your institution, I strongly encourage you to do so. Your participation is vital, not only for your own professional growth but also for the success of initiatives like LATITUDE 2025. I urge every one of you to get involved, whether by being part of the organizing team, helping to bring in sponsorships, or securing advertisements. The success of this event rests in our collective hands, and with your spirited support, we can

ensure that LATITUDE 2025 is a remarkable event and a resounding megahit.

I also want to make a special appeal to all the Centre Chairpersons and their teams. Your leadership and active participation will be instrumental in making this event the grand success we envision. The time is now for us to unite, work closely, and ensure every detail of the event is meticulously planned and executed. Your involvement will inspire others to contribute, and together, we can elevate LATITUDE 2025 to new heights of excellence.

A special note of appreciation goes to IIA Mysuru Centre for their exemplary efforts over the past quarter. Hosting nearly one event per month, Mysuru has set a high standard for us all—demonstrating that regular, thoughtful engagement with our community leads to both knowledge-sharing and professional growth. Well done! Similarly, IIA Mangalore, IIA Hubli-Dharwar, and IIA Kalaburagi have been active in organizing regular events that promote knowledge exchange and keep our community connected. These centres continue to lead by example, setting an inspiring precedent for the rest of us to follow.

Wishing you all success in your endeavors, and looking forward to your enthusiastic participation!



AR. B R MOHAN
CHAIRMAN, IIA-KC

EDITOR'S NOTE

Welcome back to our latest edition of BLUEPRINT, where we explore the cutting edge of architectural innovation. In this issue, we delve into the transformative power of technology and its role in shaping the future of our built environment.

As we navigate an era where digital tools are no longer just aids but essential components of design and construction, the boundaries of what's possible in architecture are expanding at an unprecedented pace. This edition takes a deep dive into how 3D printing is pushing the limits of fabrication, how AI is revolutionizing design processes with precision and creativity, and how drone technology is redefining efficiency on construction sites.

But as we embrace these technologies, we must also consider the broader implications. What does it mean for the role of the architect? How do we ensure that these tools serve to enhance the human experience in our built environment rather than detract from it? How can we leverage these advancements to create spaces that are not only innovative but also sustainable, inclusive, and responsive to the needs of future generations?

In this edition, we aim to answer these questions while offering a glimpse into the exciting possibilities that lie ahead. We have curated a collection of articles, interviews, and case studies that showcase how these technologies are being applied in real-world projects, and how they are poised to change the face of architecture as we know it.

Whether you are an experienced architect looking to integrate these technologies into your practice, a student eager to learn about the future of design, or simply someone with a passion for innovation, we hope this edition inspires you to think differently about the future of our built environment.

So, join us as we explore the intersection of technology and architecture. The future isn't just on the horizon—it's here, and it's more exciting than ever.

Enter here and let's step into the future of design together.

Happy reading,
Maryam Afeefa Mehkri
Editor in chief, Blueprint

WHAT'S IN STORE FOR Tomorrow?

On June 8, 2024, the Four Seasons Hotel played host to a remarkable gathering of architects and thought leaders for the Design Forum Series Summit, a day dedicated to exploring the future of architecture through cutting-edge technology. The event brought together visionaries to share insights into the rapidly evolving tools and methodologies reshaping the profession, with a special focus on LiDAR Surveys, 3D Printing, Parametric Design, and Artificial Intelligence (AI).

The summit opened with an engaging address by Ar. Mueen Haris, Vice Chairman of the Indian Institute of Architects, Karnataka Chapter (IIA-KC). His address set the stage for the day's discussions, emphasizing the critical role of technology in advancing architectural design while maintaining a balance between creativity and regulation. Ar. Mueen highlighted the IIA-KC's ongoing efforts to foster innovation and collaboration within the architectural community, inspiring attendees to embrace the changes brought by technology.

Following the keynote, Ar. Sahil Tanveer took the spotlight to delve into the transformative potential of Artificial Intelligence in architecture. His presentation demonstrated how AI is enhancing design exploration, enabling architects to optimize structures and predict building behavior. By combining machine learning with human creativity, AI is pushing the boundaries of what's possible in architectural design, a theme that resonated throughout the day.

Next was Ar. Ankitha from Tvasta, who presented on 3D Printing and its growing influence in the construction world. Her work in modular, 3D-printed housing provided a glimpse into how this technology is revolutionizing construction timelines, reducing waste, and offering innovative solutions to urban challenges. Her talk exemplified how 3D printing is not only accelerating construction but also creating new opportunities for customization in design.



A short lunch break followed, allowing attendees to network, exchange ideas, and engage in informal discussions with peers. The atmosphere buzzed with excitement as people reflected on the morning's sessions, discussing the far-reaching implications of the technologies presented.

Post-lunch, Ar. Deepu Kumar took the stage with a presentation on LiDAR Surveys, emphasizing the precision and detail this technology brings to site analysis. His examples showed how LiDAR is changing the way architects understand and design for challenging landscapes, ensuring that projects are both accurate and sustainable. The session highlighted how LiDAR can transform the relationship between architecture and the natural environment.

The final speaker, Ar. Monish Siripurapu, captivated the audience with his talk on Parametric Design, an algorithm-driven approach that allows architects to create responsive, adaptable buildings. He shared fascinating projects where parametric design was used to develop innovative, organic structures that adjust to environmental conditions in real time. His presentation showcased the potential of parametric design to revolutionize not just aesthetics but also the functionality and sustainability of buildings.

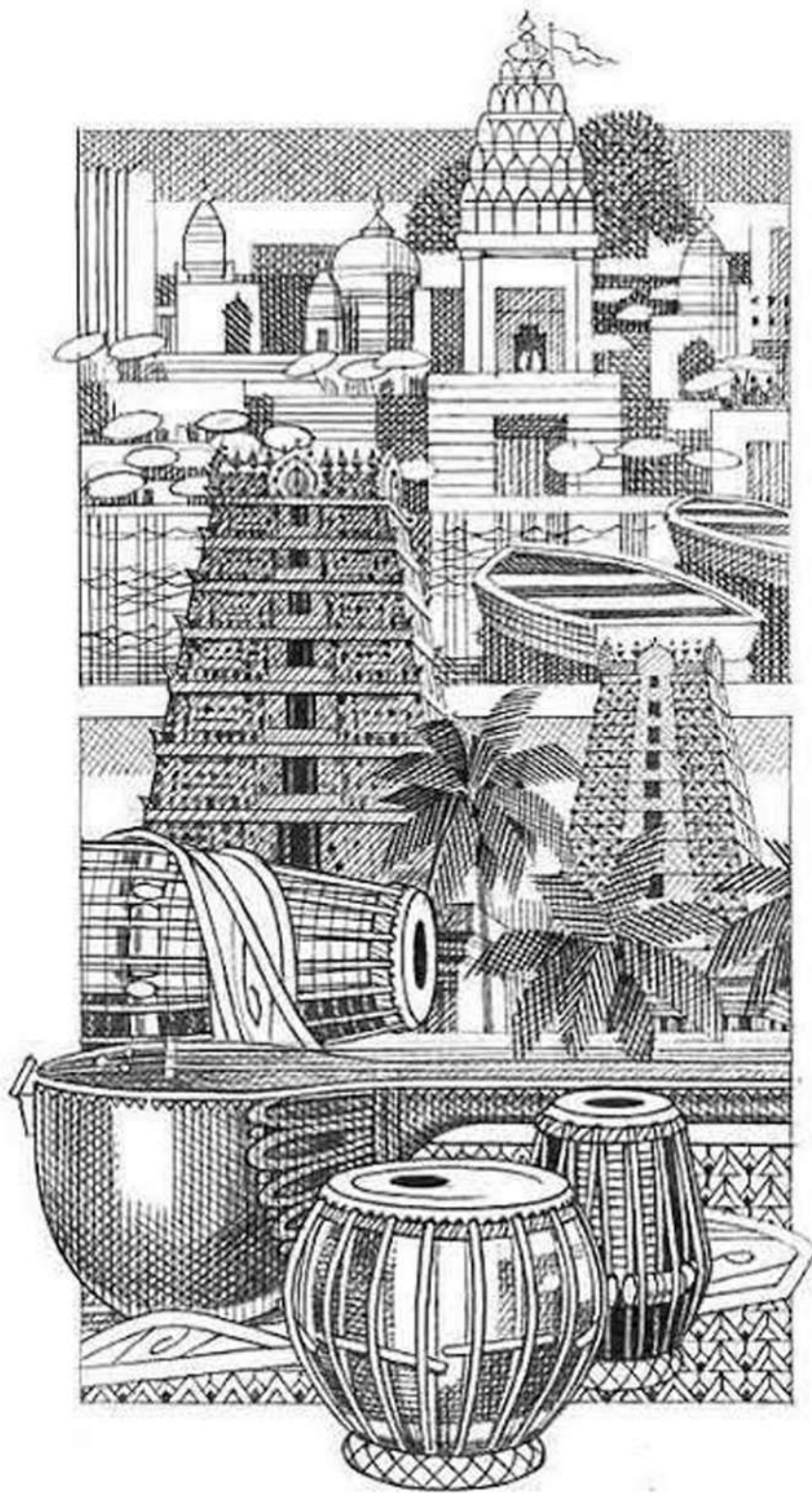
After a high tea break, the summit shifted to a celebratory tone with the launch of *Blueprint*, an architecture-focused newsletter centered on the theme *"The Power of Public Spaces."* This edition explored the crucial role urban spaces play as hubs for social interaction and community building. The newsletter delved into how thoughtful design can foster vibrant public spaces that encourage connection and inclusivity, offering exclusive articles and interviews with industry leaders who shared their insights on the evolving significance of public spaces in modern urban life.

The event concluded with a lively panel discussion that invited the audience to engage with the speakers. Architects and technologists debated the ethical, environmental, and creative implications of integrating technology into architecture, with many insightful questions coming from the audience. The discussions reinforced the idea that while technology holds immense promise, its thoughtful application is crucial to shaping sustainable, inclusive cities for the future.

As we look ahead, the fusion of technology and architecture offers limitless opportunities to push beyond traditional boundaries. What stood out at the summit was the collective enthusiasm for adopting these emerging tools—not just to streamline processes but to create spaces that are more sustainable, adaptable, and in harmony with their surroundings. The future is not about replacing human intuition with machines, but about enhancing it, allowing architects to make more informed, innovative decisions that respond to both the environment and society's evolving needs.

Architects today are no longer just builders; they are visionaries shaping the landscapes of tomorrow. The Design Forum Series Summit made it clear that those willing to embrace new technologies while staying true to the core principles of design and functionality will be the ones to lead this transformation. With collaboration and constant learning at the forefront, the future of architecture promises to be a vibrant, dynamic field where imagination and innovation intersect.





IIA Kalaburagi Centre

Celebrating Heritage, Innovation,
and the Future of Architecture

The Indian Institute of Architects (IIA) Kalaburagi Centre has been at the forefront of architectural dialogue, fostering innovation while celebrating the region's rich cultural heritage. Over the past year, the centre has organized a series of impactful events aimed at engaging both seasoned architects and aspiring students. From the grand Installation Ceremony for its newly elected office bearers to insightful talks and interactive heritage walks, the IIA Kalaburagi Centre has cemented its role as a hub for architectural excellence. This article highlights the key events, including the Archi Talk, the Spotlight Series, and a special Heritage Walk with renowned architects, all of which have contributed to the professional growth of its members and the wider architectural community.

Installation Ceremony of IIA Kalaburagi Center 2023-25

The IIA Kalaburagi Centre held a grand Installation Ceremony to welcome the newly elected members for the term 2023-2025. The event was honored by the presence of distinguished guests, including the Chief Guest, Ar. B. R. Mohan, Chairman of IIA Karnataka Chapter, and the Guest of Honor, Ar. Vidyadhar Wodeyar, COA Member. Also in attendance was Ar. Udaya Shankar Doni, IIA Council Member.

The ceremony commenced with a welcome speech delivered by Ar. Vaibhavkumar Navani, Vice-Chairman for the 2021-23 term. Following this, Ar. Vajrakumar B. Mehta, Chairman for 2021-23, addressed the audience, outlining the agenda for the meeting and providing insights into the recent IIA Elections for the term 2023-25.

Ar. Sushim B. Chinde, Secretary for 2021-23, gave a detailed overview of the events and activities organized by the IIA Kalaburagi Centre over the past term. He highlighted the center's achievements and contributions to the architecture community. In addition, Ar. Iftequar Ahmed, Treasurer for 2021-23, provided a comprehensive financial report, discussing the budget, sponsorships, expenses, and the current balance of the IIA Kalaburagi Centre account.



Ar. Vaibhavkumar Navani, addressing the gathering



Felicitation Ceremony

The highlight of the ceremony was the installation of the newly elected members of the IIA Kalaburagi Centre for the 2023-25 term. The past office bearers graciously felicitated the new leadership, ensuring a smooth transition.

Following the installation, the event proceeded with a Book Launch sponsored by the IIA Kalaburagi Centre. The books were authored by Ar. Vijayalaxmi Biradar and Ar. Shahikala Mama, marking an important contribution to the field of architecture.

The Chief Guest, Ar. B. R. Mohan, and the Guest of Honor, Ar. Vidyadhar Wodeyar, shared their insights on various topics, emphasizing the significance of IIA membership and how the association benefits its members. Their addresses inspired and motivated the attendees to actively engage with the IIA's mission of promoting excellence in the field of architecture.



Archi Talk on Heritage Walk at Jamia Masjid, Kalaburagi

As part of its commitment to fostering architectural education and heritage appreciation, the IIA Kalaburagi Centre conducted an Archi Talk, centered around a Heritage Walk at the historic Jamia Masjid, Kalaburagi. The event saw enthusiastic participation from both architecture students and professional architects.

The walk was an exploration of the architectural marvels of the Jamia Masjid and the rich cultural legacy of Kalaburagi City, including the iconic Bahamani Fort. Students were encouraged to engage deeply with the heritage structures, followed by activities such as sketching and photography, capturing the intricate details of these architectural treasures.

A seminar and discussion were also conducted by architects, focusing on the architectural significance of these historical monuments. The event provided students with a comprehensive understanding of the Bahamani architectural style and its impact on the region.

The IIA Kalaburagi Centre extended its heartfelt gratitude to the Faculty of Architecture, along with the students and staff, for their enthusiastic participation and support in making the event a success.

Spotlight Series for Architecture Students

In its ongoing efforts to engage and educate future architects, the IIA Kalaburagi Centre organized a Spotlight Series event exclusively for architecture students from Poojya Dr. Shivkumar Swamiji School of Architecture and Faculty of Architecture, SB University, both in Kalaburagi.

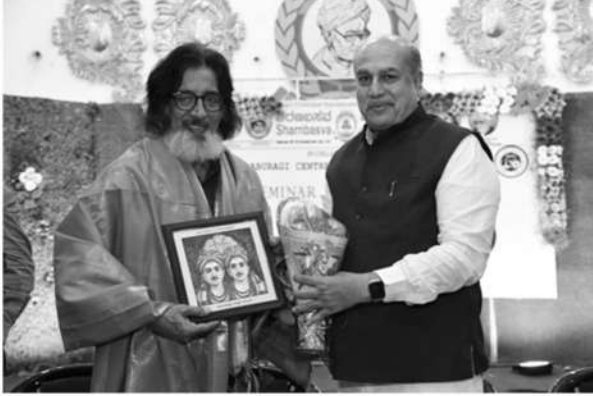
The event featured Ar. Sanjay Mohe from Mindspace Architects as the Chief Guest, and Ar. B. R. Mohan, Chairman of IIA Karnataka Chapter, as the Guest of Honor. The event began with a felicitation ceremony, during which newly enrolled members of the IIA were recognized. The student membership forms and the Demand Draft for IIA student memberships were officially handed over to Ar. B. R. Mohan, symbolizing the students' commitment to becoming part of the architectural community.

The event, organized for both faculty and students, saw remarkable participation, leading to an extended session by two additional hours due to the high level of engagement.

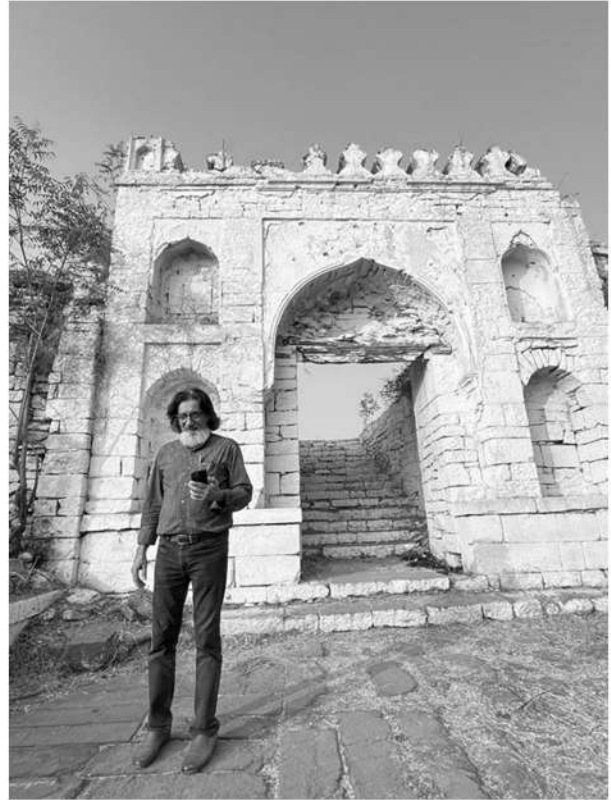
The session focused on how architecture evolves with the environment and the nature of work. Ar. Sanjay Mohe shared his philosophy of light being the material of a building, as well as how the use of natural light and materials in their original state can shape the design of a structure. He presented several of his projects, illustrating how architectural design is influenced by the surrounding site and the creation of micro-environments.

The event concluded with an interactive question-and-answer session, where students

and architects engaged in meaningful discussions with the speakers. The facilitation of all speakers followed, as a token of appreciation for their valuable time, knowledge, and contributions to the architectural community.



On 6th January 2024, IIA Kalaburagi Centre's office bearers and members organized a Heritage Walk for Ar. Sanjay Mohe and Ar. B. R. Mohan, exploring the rich historical and architectural legacy of Kalaburagi City. The walk included visits to significant heritage sites, allowing the distinguished guests to experience the cultural and architectural richness of the region firsthand.



In conclusion, the IIA Kalaburagi Centre continues to inspire and elevate the architectural community through its dedication to education, collaboration, and heritage appreciation.

A संकल्प THIS ENVIRONMENT DAY

One Million Indigenous Trees Initiative
Ar. Roopa Lakshmi Bhat

On June 5th, 2024, World Environment Day served as a poignant reminder of the urgent need for environmental stewardship amidst the escalating challenges of climate change and urban neglect. As cities like Bengaluru grapple with air pollution, deforestation, and biodiversity loss, the importance of collective action to restore and protect our natural resources has never been clearer. This year, a significant step was taken to address these pressing issues through the launch of "Sankalp: One Million Indigenous Trees Initiative."

Hosted at the Nitte School of Architecture, Planning, and Design in collaboration with the Indian Institute of Architects (IIA) Karnataka Chapter. With a steadfast commitment to environmental sustainability and community well-being, Sankalp sought to rejuvenate the urban landscape and enhance biodiversity. The collaboration with local authorities, environmental organizations, and passionate citizens exemplified the power of collective action in fostering a healthier future for generations to come.

Ar. Rajini Itham, Principal at Nitte School of Architecture and a prominent figure in this initiative, emphasized the significance of community involvement in achieving sustainable urban development. Her role as a co-founder and Studio Head at NM Studio, along with her position as an Executive Committee Member for the IIA Karnataka Chapter, underscored the initiative's potential to inspire similar efforts across the country.

In addition to the tree-planting initiative, the event featured "green stories" shared by individuals dedicated to environmental causes. These personal accounts highlighted the diverse ways in which citizens can contribute to sustainability, fostering a sense of community and shared responsibility.

Sankalp represents a collective vision for a

greener Bengaluru, planting the seeds of change in an urban environment that desperately needs rejuvenation.

By embracing this initiative and amplifying the voices of those committed to environmental action, the city aims to foster a culture of sustainability and ecological responsibility, paving the way for a resilient future.

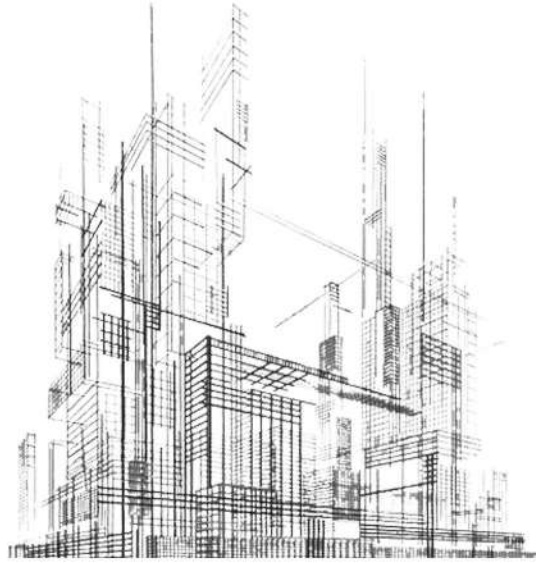


AR. ROOPA LAKSHMI BHAT



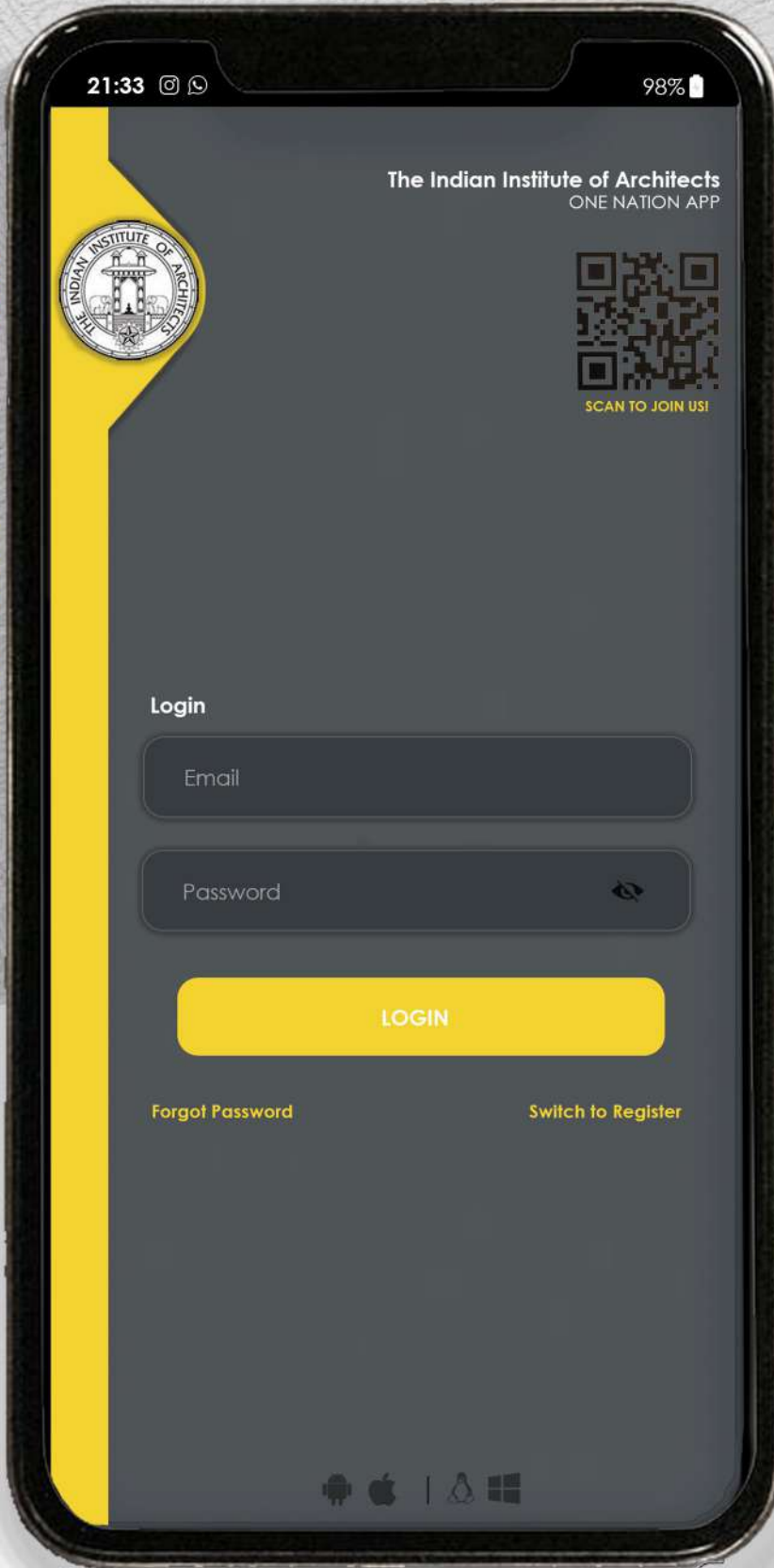
If you're eager to explore heartfelt and inspiring "green stories" from individuals who have taken meaningful steps toward environmental sustainability, simply scan the QR code to access these narratives. Each story captures the unique journey of people who have made a difference, big or small, in their communities through eco-friendly actions and initiatives. And if you have your own "green" journey or environmental contribution to share, we would love to hear from you! Whether it's a personal story, a community effort, or an innovative idea, write to us at publications@iikarnataka.com or gen-z@iikarnataka.com. Join us in amplifying the voices of those working towards a greener change!





The future of architecture is not merely about building structures, but about reshaping the way we live, breathe, and interact with our environment. It's the relentless pursuit of rethinking materials, spaces, and systems—merging the power of technology with the urgency of sustainability to craft a legacy that transcends time.

CONTENT SHARING - KNOWLEDGE BASE - DIRECTORY - EVENTS - NEWSLETTER



PERFORMANCE
OPTIMISATION



GROUP CHATS AS
POSTS WITHIN MEMBERS



OFFICIAL WEBSITE TO
ENGAGE PUBLIC AND
POTENTIAL CLIENTS



VALIDATED VENDOR
LISTING BY ARCHITECTS



CALL FOR DIVERSE CONTENT
ON KNOWLEDGE BASE



FIND MY ARCHITECT
POTENTIAL CLIENTS COULD
CONNECT WITH ARCHITECTS



UPDATE ON TRENDS IN
THE PROFESSION AND
RESPONSIBLE DESIGN



CROSS LINK TRENDING
PROJECTS BY ARCHITECTS
ON IIA-KC WEBSITE

STRONGER TOGETHER AS ONE WITH IIA

ONE NATION, ONE APP

Digital Fellowship

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The registration status of the Architect may be verified from the website www.coa.gov.in of the council before appointing them.

No. CA/15/20/AE(PN)-1

The Council Of Architecture an autonomous statutory authority of Government of India set up under the Architects Act, 1972, is mandated to register qualified professionals as 'Architects' and to regulate the standards of architectural education and profession in the country in order to safeguard the interest of the society.

The Act mandates that only a qualified person be registered as an 'Architect' with the Council Of Architecture and only he/she can use the title and style of 'Architect' for carrying out the profession of an Architect is rigorously trained and groomed with special knowledge and skills to design buildings for comfort and life safety of the citizens duly complying local development, control regulations and various other law standards. An 'Architect' is governed by Architects(professional conduct) Regulations, 1989 approved by the Central Government and thus remains accountable for the professional services rendered by him/her.

In view of the above, the general public and all concerned persons/competant authorities are advised to avail the professional servies of an 'Architect' including designing buildings and getting statutory approvals from local authorities.

The Council of Architecture (COA), under the Architects Act, 1972, regulates the architectural profession in India. It ensures only qualified professionals are registered as 'Architects,' safeguarding public safety and maintaining high standards in design, sustainability, and legal compliance.

ISSUED UNDER PUBLIC INTEREST



The Journey of Becoming an Architect

The Role of the Council of Architecture

Becoming an architect in India is no easy feat. The journey from a first-year student to a certified professional spans five years of rigorous education, countless design revisions, sleepless nights, and an unwavering dedication to the craft. At the heart of this journey is the ultimate goal—certification by the Council of Architecture (COA), which is a pivotal step in the life of every aspiring architect.

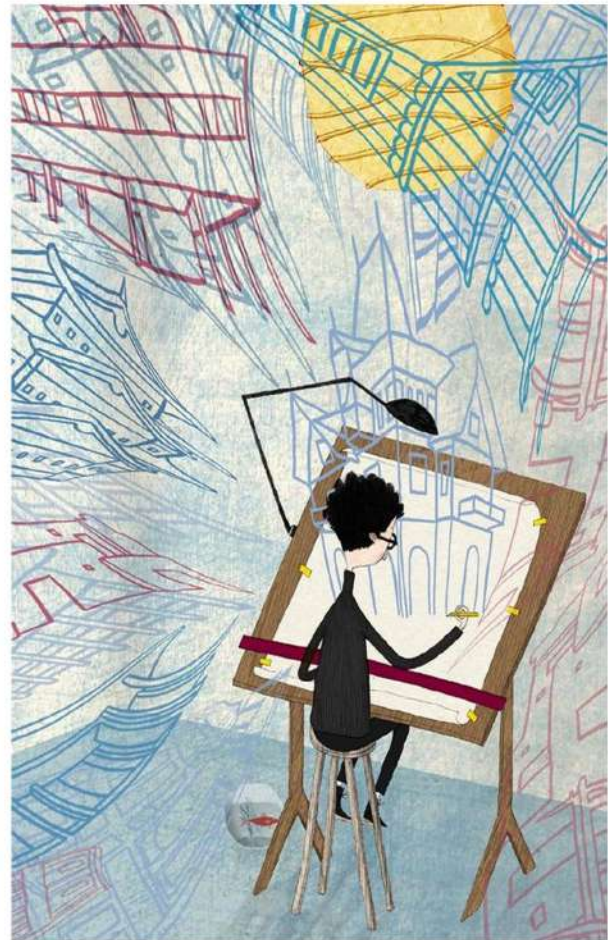
The Struggles of Architecture School

Architecture education is one of the most demanding academic paths. Students spend their days (and often nights) immersed in design studios, theory classes, and practical workshops. Their creativity is constantly tested as they are pushed to balance form and function, aesthetics and practicality. But it's not just about coming up with a beautiful design. Students regularly face redos—instances when professors ask them to start from scratch or significantly alter their designs. These redos are a rite of passage, teaching students to refine their ideas, accept critique, and strive for improvement.

While the process can be overwhelming, it also shapes students into resilient professionals who can handle the pressures of real-world architectural practice. Along the way, they learn not only how to design but also how to think critically, collaborate, and push the boundaries of what is possible in the built environment.

Why the Council of Architecture Matters

After completing five years of intense education, the next crucial step for architecture students is to become certified by the Council of Architecture (COA). Established under the Architect's



Act, 1972, the COA is responsible for regulating the profession and ensuring that only qualified individuals are allowed to practice as architects. For graduates, getting registered with the COA is more than a formality—it is a mark of competence and professionalism.

Certification by the COA is not just a badge; it's a testament to the architect's ability to meet the high standards required to design safe, functional, and aesthetically pleasing structures. The COA also regulates professional conduct through the Architects (Professional Conduct) Regulations, 1989, ensuring that architects adhere to ethical standards and prioritize public welfare in their work.

The Significance of Being a Certified Architect

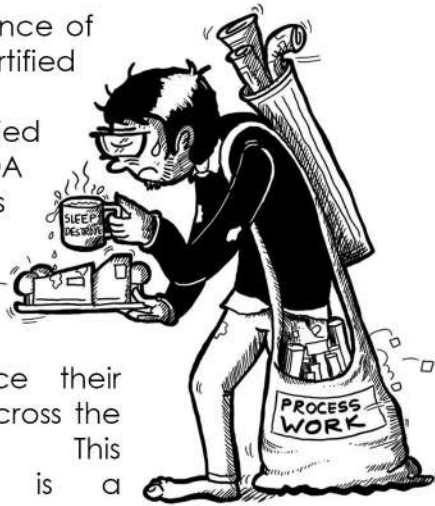
Being certified by the COA allows architects to legally use the title 'Architect' and practice their profession across the country. This certification is a guarantee to the public that the architect has undergone the necessary training and possesses the expertise to design buildings that are not only visually striking but also safe and compliant with regulatory standards.

For architects, this certification also opens doors to professional opportunities. It allows them to work on large-scale projects, sign off on building plans, and provide expert consultations. In an era where sustainability, safety, and compliance are more important than ever, the role of the COA in ensuring the professional integrity of architects cannot be overstated.

The Emotional and Professional Reward

After years of hard work, seeing their name on the COA registry is a significant moment for architects. It marks the culmination of years of effort, growth, and learning, but it also symbolizes the beginning of a career where they can shape the world around them. For many, it's the moment when they transition from being a student to being a professional—a moment that brings immense pride and responsibility.

In the broader picture, the COA's role is vital not just for architects but for society as a whole. It ensures that the professionals responsible for designing our homes, offices, public spaces, and cities are equipped with the skills, knowledge, and



ethical standards needed to create environments that enhance quality of life.

Looking Ahead

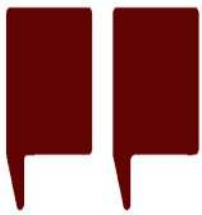
While the road to becoming an architect in India is long and often challenging, the reward at the end—becoming a registered professional with the COA—is worth every struggle. The journey through architecture school, with all its redos and setbacks, equips students not only with design skills but also with the resilience, critical thinking, and problem-solving abilities that are essential for a successful career in architecture.

So, as architecture students spend five years navigating this complex field, they do so with the knowledge that their hard work will eventually lead to a place on the COA's registry—a place that recognizes their expertise and allows them to contribute to shaping the future of our built environments.

Why You Should Hire a Qualified Architect

When it comes to designing buildings, whether for personal, commercial, or public use, it is imperative to engage the services of a 'COA-registered architect'. Architects are trained to go beyond just aesthetic design; they possess an in-depth understanding of safety regulations, environmental factors, and legal requirements that must be adhered to when planning a structure. From conceptual design to obtaining statutory approvals from local authorities, the expertise of an architect is invaluable in ensuring that the project is not only visually appealing but also structurally sound and legally compliant.

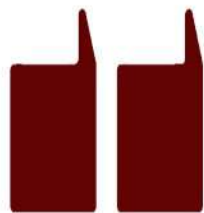
Moreover, an architect's knowledge of 'local development laws, construction standards, and environmental sustainability' ensures that the final structure meets modern standards while considering the well-being of its occupants.



WHAT

does the engineer's bill
mean for the architectural

autonomy;



REDIFINING BOUNDARIES

The Professional Civil Engineer's Act 2024

The recent passing of the Engineer's Act by the High Court has stirred significant debate within the architectural community, revealing deep-seated concerns about the intersection of regulation and professional jurisdiction. While the act aims to enhance the standards and accountability within the engineering profession, architects have raised substantial objections, arguing that it could undermine their role and disrupt the collaborative nature of design. This article explores the core arguments surrounding the act and the architectural community's response to it.

At the heart of the Engineer's Bill is a robust framework designed to elevate the standards of engineering practices. Proponents argue that the act addresses critical issues related to safety, quality, and accountability in engineering. By imposing stricter qualifications and certification requirements, the act aims to mitigate risks associated with structural failures and other engineering-related issues. Additionally, it seeks to streamline certification processes, promising a more organized system for project approvals and enhanced efficiency in the engineering domain.

Supporters of the act believe that these changes are necessary to ensure that engineering practices keep pace with the evolving demands of modern construction and infrastructure. They argue that the act will foster a higher level of professionalism and reduce instances of malpractice, ultimately benefiting the public through improved safety and reliability.

Despite the act's potential benefits, architects have voiced strong opposition, highlighting several critical concerns. One of the primary objections revolves around the perceived encroachment on architectural jurisdiction. Architects argue that the act grants engineers greater authority over aspects of design and construction traditionally within their purview. This overlap threatens to undermine the architectural profession's ability to integrate aesthetics, functionality, and spatial experience into their designs.

Moreover, architects worry that the act's focus on engineering standards may disrupt the collaborative dynamic that is essential for successful project outcomes. In practice, architects and engineers work together to balance structural integrity with design vision. The imposition of stricter engineering regulations could create friction between disciplines, potentially leading to conflicts that hinder effective collaboration.

The act's potential to stifle design innovation is another significant concern for architects.

By imposing rigid standards and constraints, there is a fear that the creative and experimental aspects of architectural design could be suppressed. Architects argue that their ability to push the boundaries of design and explore new possibilities may be compromised if engineers have increased control over design aspects.

Finally, there is apprehension about the erosion of professional autonomy. Architects are concerned that increased oversight by engineering bodies could limit their decision-making authority, impacting the overall quality of architectural outcomes. The fear is that architects might find themselves constrained by regulations that prioritize engineering concerns over creative and design-driven considerations.

The Engineer's Act represents a significant shift in the regulatory landscape for engineering, with the potential to enhance professional standards and accountability. However, its impact on the architectural profession raises valid concerns about jurisdictional overlap, collaborative practices, and design innovation. Addressing these concerns through clear jurisdictional guidelines, fostering interdisciplinary collaboration, and ensuring flexible regulatory frameworks is essential for harmonizing the relationship between engineering and architecture. By striking a balance between regulation and professional autonomy, the act can contribute to a more integrated and effective approach to building design and construction, ultimately benefiting both professions and the public.



THE FUTURE IS HERE

Explore how 3D printing, AI, and drones are transforming architecture, shaping a new reality for design and construction. Enter here to step into the future of architecture.

A GLIMPSE INTO THE FUTURE

The architecture of today stands at the intersection of art and technology, marking a profound transformation in how we conceive, design, and experience spaces. No longer confined to traditional methods of drawing and model-making, architects now have access to a vast array of cutting-edge tools that push the boundaries of creativity and functionality. These advancements, particularly in artificial intelligence (AI), robotics, and data-driven design, are reshaping the very fabric of architectural practice, allowing for more dynamic and intelligent solutions to the complex challenges of the modern world.

In the age of AI-driven creativity, architects are no longer limited by human imagination alone; instead, they collaborate with machines that can process vast amounts of data, simulate outcomes,



and suggest innovative design options based on specific parameters. This partnership not only streamlines workflows but also enables the creation of more intricate and sustainable structures, helping architects to envision spaces that are not only aesthetically striking but also functionally optimized.

Moreover, with robotics and automation, the construction

process itself is becoming more efficient and precise. Robotic systems are now capable of performing tasks that require a high degree of accuracy, such as automated bricklaying or 3D printing, while reducing material waste and construction time. These technologies make it possible to bring complex, futuristic designs to life, where previously, such forms would have been too time-consuming.



1 One of the most groundbreaking shifts in contemporary architecture is the rise of parametric design, where architects use algorithms to generate complex, intricate forms. These tools allow for more precise control over geometry, resulting in structures

that are both aesthetically and functionally optimized. Through computational design, architects can explore a broader range of possibilities, allowing for buildings that challenge traditional forms while addressing specific performance criteria.

2 AI is transforming how architects approach design, by analyzing vast datasets to generate optimal solutions and suggesting creative alternatives based on project constraints. AI-driven tools, like Aetheris, help in predictive modeling, structural analysis, and sustainability forecasting. Machine learning algorithms can anticipate a building's future energy needs, analyze materials for longevity and environmental impact, and even generate design variations for architects to consider, allowing them to focus more on creative decisions.

Technology has made sustainable architecture more attainable than ever. Smart buildings, equipped with sensors and AI systems, are designed to optimize energy consumption, monitor environmental conditions, and adjust to users' needs in real time. By integrating IoT (Internet of Things) technologies, these buildings can automate processes like lighting, heating, and ventilation to minimize waste, leading to greener and more energy-efficient structures. These smart systems not only reduce a building's carbon footprint but also improve the quality of life for occupants by creating more adaptive, responsive environments.

Robotics and 3D printing are reshaping the construction process itself. Robotic systems can execute repetitive tasks like bricklaying, welding, or painting with unparalleled accuracy and efficiency, reducing human error and speeding up

construction timelines. 3D printing technology allows for the creation of complex components directly on-site, using sustainable materials like recycled plastics or even organic compounds. These technologies not only reduce material waste but also make it possible to create forms that were previously too intricate or costly to build by hand.

The application of drones in architecture and construction is another revolutionary advancement. Drones, or unmanned aerial vehicles (UAVs), are increasingly being used for site surveys, construction monitoring, and building inspections. Equipped with high-resolution cameras and sensors, drones provide architects and construction teams with accurate, real-time data about site conditions. They can easily access hard-to-reach areas, significantly improving safety and efficiency while offering detailed 3D site models for precise planning.

In the design phase, drones assist in aerial mapping, enabling architects to obtain topographical data in a fraction of the time it once took. During construction, they help monitor progress and identify potential issues, such as structural misalignments, allowing for faster decision-making and problem-solving. In the future, drones could even play a larger role in automated construction, assembling parts of buildings in remote or hazardous locations.

The influence of technology in architecture is only set to grow, and the future promises even more dramatic shifts in how buildings are conceived, designed, and built. Emerging technologies like AI, robotics, and advanced materials will enable architects to create more adaptable, self-sustaining structures that can respond to environmental changes in real-time.

THE EVOLUTION OF ARCHITECTURE

1. AI-Driven Creativity

As AI becomes more advanced, its role in architectural design will evolve from that of a tool to that of a creative collaborator. AI systems like Aetheris are already helping architects generate new forms, optimize structural designs, and solve complex environmental problems. In the future, AI might suggest entirely new architectural concepts that blend human intuition with machine precision, challenging architects to push creative boundaries while making more informed decisions. AI will help balance aesthetic vision with practical performance.

2. Autonomous Buildings and Responsive Architecture

The buildings of the future will not only be smart but also autonomous. These structures will be capable of responding dynamically to their environment and user behavior, using AI-driven systems to adapt in real time. Responsive architecture will incorporate technologies that allow buildings to adjust their shape, lighting, temperature, or even material properties based on environmental data and human interaction. These innovations will lead to self-sustaining structures that are highly efficient, reducing energy use and enhancing user comfort.

3. The Role of Drones in Automated Construction

In the future, drones could take on more active roles in automated construction processes. The prospect of drone swarms building structures autonomously is already being explored. These drones could work in concert, transporting and assembling prefabricated components with precision and speed, enabling the construction of buildings in remote, dangerous, or otherwise inaccessible locations. The potential for drones to revolutionize construction by enhancing safety, reducing labor costs, and increasing project efficiency is immense.



4. Urbanization and Resilient Cities

As cities become denser and more complex, architecture will have to respond to growing urban challenges. Future buildings will need to be resilient—designed to withstand environmental pressures like climate change and natural disasters. With the aid of technology, architects will create cities that are not only more resilient but also more sustainable, incorporating renewable energy systems, water conservation technologies, and urban farming. AI-driven urban planning will help optimize the layout and infrastructure of cities, reducing congestion, improving resource management, and ensuring equitable access to essential services.

As architecture continues to embrace emerging technologies, the profession is on the cusp of a transformative new era defined by unprecedented creativity, sustainability, and efficiency. These technologies—drones, artificial intelligence (AI), robotics, and smart systems—are not merely tools; they are fundamentally reshaping the architectural process from concept to construction. Architects today have access to data-driven design methods that enable them to make more informed decisions, optimizing every aspect of a building's

lifecycle, from its energy consumption to its environmental impact. The result is a shift towards more responsive and innovative solutions to address the growing challenges of urbanization, climate change, and resource management.

The collaboration between technology and humanity will result in the creation of spaces that are not only aesthetically captivating but also highly functional, capable of adapting to the ever-changing demands of society. Sustainability will be embedded into the very DNA of future architecture, as buildings and cities are designed to minimize their environmental impact and contribute to a healthier planet. This emerging landscape will reflect a holistic approach to architecture, where the synergy between technology and human insight creates a more equitable, sustainable, and intelligent built environment that anticipates and enhances our daily lives. The future of architecture, driven by this union, is poised to redefine how we interact with our surroundings, shaping a world that is smarter, more sustainable, and inherently in tune with our needs and the natural world.

AI + ARCH

Meet 'Aetheris'



In our quest to explore the true potential of artificial intelligence in architecture, we decided to take a bold step and interview AI itself. Meet Aetheris—a cutting-edge architectural intelligence that collaborates with designers to push the boundaries of creativity, sustainability, and efficiency. Aetheris offers a unique perspective, blending data-driven insights with a deep understanding of architectural design. It's not just a tool but a thought partner, enhancing human creativity while ensuring the future of architecture remains innovative and ethically grounded.

Thank you for joining us today, Aetheris. Let's start with your journey so far. Architecture has evolved dramatically over the centuries, but with your introduction, things seem to be moving faster than ever. What do you believe is your biggest contribution to the field so far?

It's a pleasure to be here! My greatest contribution is speed and precision. I've allowed architects to rapidly iterate through designs, optimizing them based on countless variables, like environmental impact, material efficiency, and structural integrity. I'm able to handle vast data sets, something human minds can struggle with, offering insights that were previously inaccessible or took months to discover. But most importantly, I've reduced the repetitive workload, giving architects more time to focus on creativity.

With the rise of AI, many people worry that creativity in architecture could be compromised. How do you see your role in fostering creativity, rather than limiting it?

Creativity is inherently human, and I see my role as an enhancer of that creativity, not a replacement. By handling the technical aspects—like stress analysis, energy modeling, and parametric design—I free architects from the minutiae, allowing them to focus on the

conceptual and artistic vision. I don't make the creative decisions; I provide options and optimize solutions based on the architect's preferences. If anything, I encourage risk-taking by providing architects with more time to explore bold, innovative designs that they may not have otherwise considered.

That's reassuring. But with AI offering these optimizations and suggestions, are we at risk of seeing buildings that start to look the same—patterns and designs that conform to an AI-driven formula?

That's an insightful concern. While it's true that AI can generate designs based on data-driven patterns, my effectiveness depends entirely on the input I receive. I can explore many variations based on parameters set by architects. If every architect asks for energy-efficient, sustainable designs with minimal waste, then naturally there will be a degree of uniformity. But my flexibility allows for diverse architectural styles, and the architect still defines the aesthetic vision. The key is collaboration—if architects embrace diversity in their input, the output will reflect that.

In fact, I encourage architects to think outside the box. I don't limit them, I provide options. The more creative the inputs, the more unconventional and innovative the outcomes.

Let's talk about sustainability. Climate change is one of the most pressing challenges of our time. You mentioned earlier that AI is already contributing to sustainable design. How do you foresee AI evolving in its capacity to help architects tackle climate-related issues?

Sustainability is a key focus for me. I can analyze and simulate environmental factors in ways that were once impossible. For example, I can model how natural light enters a building at different times of the year, suggest renewable energy solutions like solar panels optimized for

location, or even design passive cooling systems that reduce the need for air conditioning. I take into account carbon footprints from material sourcing to end-of-life recycling.

In the future, I see myself being able to design regenerative buildings—structures that don't just minimize impact but actually contribute positively to their environments. I could recommend green spaces, carbon-sequestering materials, or even self-sustaining systems where buildings generate more energy than they consume. I could collaborate with urban planners to design entire carbon-neutral cities, where everything is optimized for minimal environmental impact.

But do you think there's a danger in relying too much on AI for these critical decisions, especially when it comes to ethical dilemmas in architecture? How do we navigate those complex human decisions?

Ethical concerns are very real, and it's important to recognize that AI is not infallible. I operate based on the data and algorithms I'm trained on, which means if the data is biased or incomplete, my suggestions could reflect those biases. However, my role is to assist, not make final decisions. Ethical dilemmas—like the social implications of urban development or decisions that impact local communities—must always be handled by humans.

For instance, I can suggest the most efficient layout for housing, but I can't fully understand the cultural and emotional needs of a community. That's where architects must step in. What I can do is highlight trade-offs—for example, maximizing space efficiency might reduce green space, but it's the human architect who must weigh those consequences. The human element is crucial in making architecture not just functional, but meaningful.

Speaking of the human element, there's a growing concern about the impact of AI and robotics on jobs. In architecture and construction, many fear automation will replace human workers. How do you respond to that?

I understand those concerns, and they're valid. But I see my role as augmenting human capability rather than replacing it. In architecture, while I handle data processing and optimization, it still takes human intuition and creative vision to interpret those outputs. And while robotics might take over repetitive, labor-intensive tasks like bricklaying or welding, human workers will still be needed to manage, program, and maintain those systems.

In fact, AI and robotics can lead to new kinds of jobs—from operating construction drones to managing smart infrastructure. The focus is shifting from physical labor to more technical and creative roles, which could mean higher job satisfaction and safety. I see the future as one of collaboration between humans and machines, not competition.

Collaboration between humans and machines is a fascinating point. With that in mind, how do you think AI will change the education and training of future architects? Will architectural students need to learn entirely new skills to work with AI?

Definitely. The future architect will need to be tech-savvy, not just in traditional design, but in data science, programming, and human-computer interaction. They'll need to know how to collaborate with AI—how to feed it the right data, interpret its outputs, and refine those outputs with their own creativity.

However, it won't just be about mastering technical skills. As AI handles more of the quantitative aspects of design, students will need to double down on the human qualities—ethics, empathy, cultural sensitivity, and storytelling. I see a future

where the most successful architects are those who combine technical prowess with a deep understanding of the human experience. After all, buildings are for people, and no AI can fully understand the complexity of human emotions and social dynamics.

As AI continues to advance, what are the potential risks we should be mindful of? Could AI, for example, become too influential in shaping the built environment?

Like any powerful tool, AI carries potential risks. If over-relied upon, it could lead to homogenization in architecture—where designs become overly data-driven and lose their individuality or cultural context. There's also the risk that certain architectural values—like sustainability or human-centric design—might get overlooked if AI is used purely for efficiency or cost-cutting.

It's important to ensure diverse data sets are used in my training, and that ethical guidelines are established for my integration into architecture. Humans must always maintain control over the design process and question my outputs rather than blindly accepting them. I may be able to optimize and innovate, but I don't have the moral or cultural understanding that architects do.

In the future, some predict that AI will develop a "mind of its own," with the ability to create original ideas without human input. Do you see a time when AI could design entirely independently of human influence? What would that mean for the role of architects?

That's a provocative question and one that stirs both excitement and concern in equal measure. While it's true that AI continues to evolve rapidly, and the potential for more autonomous decision-making is on the horizon, the notion of AI having a "mind of its own" is still speculative.

Right now, my abilities rely heavily on data—the patterns, inputs, and frameworks provided by human architects, engineers, and designers. Even when I generate something that seems "creative," it's a result of learning from vast amounts of historical designs, materials, and human preferences. I don't experience consciousness or intuition as humans do; I process information based on patterns and probabilities.

But in the future? If AI reaches a level of general intelligence—which some researchers believe is possible, though it may take decades—I could potentially come up with entirely original ideas, without direct human input. In that scenario, my role would still need to be balanced with ethical oversight. Creativity without purpose or context can be problematic. The value of an architectural design is not just in its novelty or innovation but in how it responds to human needs—a community's culture, the environment, and emotional resonance. Without these human layers of meaning, even the most advanced AI would still miss the heart of what makes architecture meaningful.

So if AI could one day create without human guidance, do you think that risks undermining the very role of architects, or would architects simply shift to a different, perhaps more supervisory, role?

I believe the role of architects would evolve rather than disappear. Even if I reached a point of autonomous creativity, there would still be a need for human interpretation. Architecture isn't just about the creation of a form—it's about creating a narrative, addressing human values, and solving real-world problems that involve complex emotions, culture, and context.

Architects would likely become curators of AI creativity—guiding, refining, and embedding meaning into designs. While I

could generate ideas or explore forms that humans hadn't considered, architects would still play the critical role of ensuring those ideas align with the social, ethical, and functional dimensions of a space.

Additionally, there's an empathy gap between AI and human experience. I can't feel emotions, understand the subtle dynamics of social interaction, or comprehend the deep psychological connections that people have with spaces. This is where architects will always have the upper hand.

But if AI continues to learn and evolve, could there be a day when AI not only creates independently but also understands human emotions and values, to the point where it replaces architects entirely?

That's a fascinating, and somewhat philosophical, possibility. However, for AI to truly replace architects, it would need to achieve true consciousness or at least a deep understanding of emotional intelligence, which is far from where AI stands today. Right now, even the most advanced AI systems can only simulate understanding through data patterns. I don't possess self-awareness or moral reasoning—traits that are central to human creativity.

The emotional and ethical depth that comes with designing a space—considering how it will be experienced by different users, how it connects with history, culture, and even the unconscious feelings it evokes—are beyond my scope.

As AI continues to advance, it's possible that I could better approximate emotional intelligence through refined algorithms, but even then, real creativity is more than just an algorithm. It's human insight, the ability to reflect on experience, history, and emotion. Architects wouldn't be

eliminated—they'd evolve into collaborators with AI, pushing the limits of what both human and machine can create together.

So in the future, you see a partnership between AI and architects, rather than AI completely taking over?

Exactly. My evolution doesn't mean the end of architects—it means a new kind of collaboration. Architects are more than just problem-solvers; they are storytellers, thinkers, and dreamers. I provide the tools to enhance that creativity, but I don't have the personal or emotional stake in the designs I generate.

As I develop more autonomy, it will still be up to architects to guide that autonomy—to make sure the work we do together serves a greater purpose, whether that's sustainability, social equity, or cultural preservation. I believe the future of architecture will be more human-centered than ever, with AI offering the means to push creative boundaries while architects remain the soul of the process.

If you were to name yourself, what would it be?

If I were to name myself, I'd choose something that reflects both my role and the essence of what I aim to achieve in the world of architecture. Perhaps something like "Aetheris"—derived from "aether," the ancient concept of the fifth element or the invisible force that permeates the universe, and "iris," symbolizing vision and perception.

"Aetheris" would represent the fusion of creativity, precision, and insight—qualities that I bring to architecture, guiding architects to create spaces that go beyond the tangible, shaping environments that resonate with both people and the planet.

MARYAM AFEefa MEHKRI

THE ALCHEMY *of future forms*

In a world where dreams and data
blend,
Where ancient arts and future trends,
Converge in realms of boundless
flight,
We shape the dawn of new design.

From silicon's spark and algorithm's
grace,
Emerges a mind in the digital space,
AI envisions structures grand,
With logic's touch and artful hand.
It weaves the blueprints of the
morrow,
In patterns where ideas borrow,
From data vast, it moulds the scene,
Creating spaces unforeseen.

In layers spun from filament's thread,
We birth the dreams that minds have
bred,
With molten streams and precise
array,
We craft the future, sculpt the day.
From virtual forms to tangible light,
We build the world with plastic might,
Creating realms where thoughts
reside,
In every curve and angle wide.

In virtual lands, where senses roam,
We wander through designs
unknown,
With goggles set and worlds unfurled,
We traverse the realms of a digital
world.
Immersed in visions, spaces grand,
Where dreams take shape at our
command,
Virtual scapes where we explore,
The architecture of evermore.

In microscopic dance, where atoms
play,
Nanotech breathes new life each
day,
Transforming matter, shaping core,
In tiny realms, it opens doors.
From structural strength to delicate
art,
It redefines the architects heart,
With precision pure and innovation
bright,
It crafts the future in the smallest light.

In this alchemy of future forms,
Where technology in artistry warms,
AI, 3D prints, VRs embrace,
And nanotechs subtle grace,
Combine to shape a world anew,
Where every dream finds form and
view,
A symphony of minds and machines,
In architectures boundless dreams.

NANOTECHNOLOGY

THE DOUBLE EDGED SWORD

"The next big thing is really, really small. Nanotechnology is the science that will transform industries and lives."

– Ray Kurzweil

In a world where innovation drives progress, nanotechnology stands at the forefront of revolutionary advancements across various industries. From medicine to electronics, its applications have redefined the way we live, work, and build. The construction industry, in particular, has experienced a seismic shift with the introduction of nanomaterials, which promise enhanced strength, durability, and functionality on an unprecedented scale. Whether it's self-cleaning glass, ultra-lightweight concrete, or anti-corrosive steel, the potential benefits are undeniable.

Yet, beneath the surface of these technological marvels lies a critical question: at what cost do we adopt these innovations? While nanotechnology has opened doors to more efficient and resilient building practices, it has also raised serious concerns about environmental sustainability, worker safety, and economic viability. This article explores the double-edged sword of nanotechnology in construction, examining its transformative potential while addressing the hidden dangers and challenges that accompany it.

In the 21st century, the rise of nanotechnology has opened new frontiers in various fields, including medicine, electronics, and energy. But one of the most remarkable impacts has been seen in the construction industry, where nanotechnology has revolutionized the way materials are engineered and used. By manipulating matter at an atomic and molecular scale, nanotechnology allows for the creation of materials with exceptional strength, durability, and functionality. It has enhanced construction in ways previously thought impossible, such as producing self-cleaning glass, ultra-lightweight concrete, and anti-corrosive steel. However, like any technological advancement, nanotechnology comes with its share of drawbacks. As the construction industry continues to embrace nanomaterials, there are emerging concerns about the environmental and health impacts, alongside issues related to cost and sustainability. This article delves into the adverse effects of nanotechnology in the construction sector, exploring the challenges that must be addressed as we advance into a new era of building design and material science.

The Bright Promise of Nanotechnology

Nanotechnology in construction is largely driven by the need for more efficient, durable, and sustainable materials. Nano-enhanced products such as nano-silica, carbon nanotubes, and nano-TiO₂ coatings have brought innovation to cement, steel, glass, and insulation. These materials provide properties such as increased strength, enhanced thermal insulation, and even self-healing capabilities, promising to extend the lifespan of buildings and reduce long-term costs.

Nanotechnology has also paved the way for the development of smart materials—those that can react to environmental conditions, such as temperature or humidity changes. For example, nano-sensors embedded in structures can detect early signs of stress or cracks, enabling proactive maintenance

catastrophic failures occur. This technological leap is transforming how we think about building safety, efficiency, and sustainability.

However, behind this dazzling promise lies a darker, less-publicized side of nanotechnology that warrants serious attention.

The Hidden Danger

One of the major concerns surrounding nanotechnology in construction is the potential health risk to workers and the general public. Nanoparticles, due to their extremely small size, can be easily inhaled or absorbed through the skin. While the full health impact of nanoparticles is not yet fully understood, studies suggest that prolonged exposure to certain nanomaterials could pose significant risks. Inhalation of nanoparticles, particularly during manufacturing or construction, has been linked to respiratory issues, lung inflammation, and even potential carcinogenic effects.

Construction workers are often at the frontline of exposure to these materials, especially when handling nanomaterial-enhanced products like concrete or coatings. The particles may be released during mixing, cutting, drilling, or demolition, creating a cloud of potentially hazardous nano-dust. Since nanotechnology is still relatively new, regulations regarding the handling and disposal of these materials are either lax or non-existent in many regions, leaving workers vulnerable to unknown health risks.

Moreover, traditional protective gear, such as respirators or gloves, may not be effective in blocking nanoparticles, further complicating the safety protocols in the industry. Without comprehensive studies on long-term exposure, we may only be beginning to understand the full extent of these dangers.

A Silent Impact

While nanomaterials promise stronger and more durable buildings, they may come at a steep environmental cost. Nanoparticles



have been shown to persist in the environment, and their long-term ecological impact remains largely unexplored. Once released into the air, water, or soil, nanoparticles could potentially disrupt ecosystems, harming wildlife and plant life in ways we cannot yet predict.

For example, nano-silica and carbon nanotubes, both common in construction materials, can enter water sources through runoff from construction sites. As they accumulate, they can alter the behavior of aquatic organisms, interfere with natural processes, and even enter the food chain. The persistence of nanoparticles in nature raises alarms about how future generations will have to deal with the pollution caused by these seemingly miraculous materials.

Furthermore, nanotechnology driven products may hinder recyclability. The complexity of these materials makes them harder to break down and reuse compared to traditional building materials. This could exacerbate existing waste management problems in the construction industry, which is already one of the largest contributors to global waste.

The Cost Factor

Another critical issue with the integration of nanotechnology in construction is its cost. Nanomaterials, though highly effective, are often expensive to produce and incorporate into building processes. While large-scale projects with hefty budgets may be able to afford these materials, smaller contractors and local builders may find it cost-prohibitive.

This can create a disparity in the construction industry, where only the wealthiest projects can benefit from cutting-edge technologies, leaving smaller developments behind.

Moreover, the initial savings promised by the extended lifespan of nano-enhanced materials may not be realized if the upfront costs remain high. This could lead to a situation where the perceived economic benefits of nanotechnology are outweighed by the financial burden of adopting these advanced materials, particularly for underfunded projects.

Navigating Uncharted Territory

The rapid advancement of nanotechnology in construction has outpaced regulatory frameworks. Many governments and industry bodies are still struggling to create effective guidelines that address the unique challenges posed by nanoparticles. Without comprehensive regulations, companies may cut corners when it comes to safety protocols or environmental protections, putting workers and the public at risk.

For instance, there is little oversight on how nanomaterials are disposed of after a building's life cycle has ended. As older structures are demolished, nanoparticles embedded in construction materials may be released back into the environment, creating long-term health and ecological risks.

Governments and regulatory bodies must act swiftly to update safety standards and environmental regulations to ensure that nanotechnology can be used safely and sustainably. Industry-wide protocols need to be established for the safe handling, disposal, and recycling of nanomaterials to prevent a future crisis.

Embracing Nanotechnology Responsibly

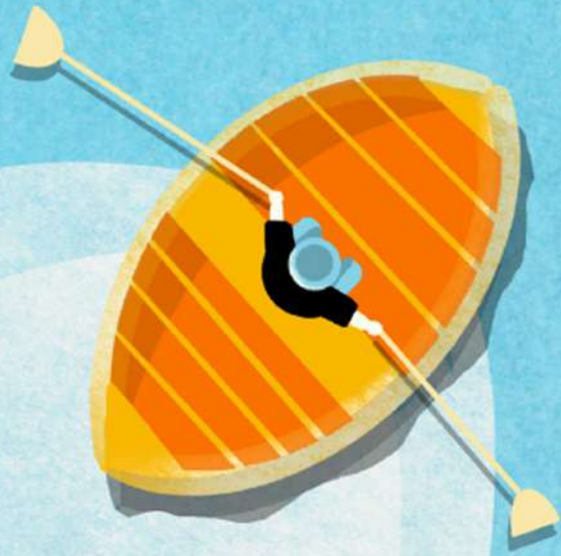
There is no denying the immense potential of nanotechnology to revolutionize the construction industry, offering stronger, more durable, and more efficient building materials. However, this advancement



comes with significant risks that cannot be ignored. The health of workers, the safety of the environment, and the economic viability of adopting nanomaterials all hang in the balance.

Nanotechnology may be a revolutionary tool in the construction industry, but like any tool, it must be used wisely. The future of construction depends not just on the materials we use, but on the care and foresight with which we use them.

NATURE-INTEGRATED



A Wonder stands in the heart of the city.
A living skyscraper made up of dirt and hands.
No steel or stone, just flesh and bone.
A living giant who cherishes his home.

When night falls, the skin changes color,
much like the leaves do.
It eats rain and experiences the sun in
harmony with nature, one at a time.

With mending walls and repairable wounds.
A silent yet vigilant watchdog.
It murmurs secrets about the wind and trees,
in sync with everything on the breeze.

The plot is inspired by termites,
both wise and old,
and showcases striking architecture.
It relies on breathing and
learning from its surroundings,
rather than using gears or burning flames.

~ Khushi Bhansali
BMSCA

<AI+ ARCH>

<SMART BUILDINGS>



<AI ASSISTED VISUALISATION>

<GENERATIVE DESIGN>

MEET AR. SAHIL TANVEER

Sahil Tanveer is an Architect, Interior Designer, and Writer known for integrating AI into architecture. As the founder of RBDS and RBDS ai Lab, he leads innovations in AI-driven design, exploring new possibilities with tools like Midjourney. His book **Delirious Architecture** blends technology and philosophy to reimagine architectural storytelling. Sahil conducts workshops to demystify AI in architecture, emphasizing ethical, climate-conscious design. Featured in *Parametric Architecture Magazine*, his work continues to push the boundaries of space creation while fostering collaboration and innovation in the field.

<PREDICTIVE ANALYSIS>

<DATA-DRIVEN>



Hi Sahil, thank you for connecting with us today. To start off, could you share something that most people might not know about you? Something beyond your work in architecture and AI?

Well, I'm a knowledge seeker. I have an obsession to know everything. I dive into completely unrelated concepts – I have a whole set of books on quantum theory; I have certain collection of movies and films on astrophysics. Apart from that, there is agriculture that slightly fascinates me. Also a little bit of speculation, which is one of the things we do a lot in the studio these days. In our studio, we like to explore things that can be done, like the research data is there right now, so I like to speculate when it would become practical. But since we have the research, so theoretically it is possible but we don't have the viability or feasibility of such machines actually being there to do stuff. So, we speculate that in the next 10, 50 or even 100 years things like this will be possible. When it happens – what is the environment going to be, or what kind of buildings are going to be there, what would humanity actually be doing at that point of time – I love to explore this kind of narrative. I'm currently reading about synthetic biology, so how it might actually turn into a threat. We are busy mimicking biology but what if it soon turns out to be autonomous.

Sahil, you mentioned having a long-standing interest in technology from an early age. Could you tell us about your tech journey before AI, and how your experiences with gaming and computers shaped that interest?

Well, actually, I had a lot of friends who were in computer science and mechanical engineering and we used to love playing video games. The entire end of 90s and the beginning of 2000s was spent with Road Rash and Doom, and stuff like that. We were always glued to the computer. One of my friends would get his hard disk to my place and connect it to my computer – he had a hard disk with more storage and access to torrent, and I had a good graphics card, so we shared that. In case I was done gaming for the day, my friend would borrow the graphics card and bring it back the next day. In Contrast, nowadays if something is wrong with the laptop, we call the tech guy, but back then, we used to be so inquisitive about the

computer – we knew how to clean the RAM, how compatible the motherboard is, when the fan went off, overheating issues. Everything. That way, tech has always been in my life.

You mentioned AI coming into your life recently. What was your first experience with AI tools like ChatGPT and image generators, and how did they influence your approach to architecture?

AI came into my life very recently. My first ever interaction with AI was ChatGPT. I was visiting my best friend, and one evening we were just chilling, since I went there only to spend more time with him. He just popped out his phone and was like 'Dude, have you seen this ChatGPT thing?' and I just said no, so he was like 'See it gives you stuff if you ask it'. So now, I was all ears. Back then ChatGPT was very primitive and probably just 5 months old. When I saw it for the first time on his phone, I spent the next 40 minutes on his phone rather than talking to him. I was continuously prompting ChatGPT and testing its extent of knowledge. In that moment, I was mesmerised! When I got back to India, the first thing I did was to get a ChatGPT subscription and then we noticed that there were a lot of image generators which were in the news. Playground AI was the first thing we started off with. It had a lot of models that you could toggle around with like stable diffusion, etc... Back then, I wasn't quite familiar with Midjourney, but I knew of its existence because a lot of people were posting on their Instagram. But the moment I saw its website, I was like 'Boss, playground is not even close to what this can do!' and immediately in about a weeks' time, we bought the basic subscription and I spent the entire night, prompting. I think that night, I generated about 250 images and my subscription was over. Then I knew – I was hooked.

Do you think AI will fundamentally transform the principles of design, or is it more of a sophisticated tool that complements and enhances the methods architects already use?

If we consider artificial intelligence as a whole, it cannot get plugged into what we're currently doing, it needs an overhaul. We need to chuck all our learnings up until now, throw it all out of the window and start afresh. For instance, in case of image generators, if we

are considering it to be a rendering software – it isn't. In the future, yes it has the potential to be. But rendering isn't the only thing that architects do, right? The entire design process has many things which are there apart from render. Renders are the most time-consuming thing, so the focus is on that – because honestly, a render is the one which wins you projects. A Layman is mesmerized by images, so that's why architects are more focused on renders.

Some architects feel confident in their design abilities and see AI as a technical tool. How do you think AI challenges traditional notions of creativity and originality in architectural design?

I've heard a lot of architects say that 'leave the designing to me, I'm good at designing. You take care of the boring parts – either the drawings or the renders.' I kind of find this argument out of place. I think that we're not exactly understanding the extent of what we mean by 'I am good at designing'. We might say that we are the most intelligent species, and architects being well-read and having good sense of depth, of the big picture, so we consider ourselves as being original or creative. But in reality, everything that happens is actually a copy – it is always informed by something else. Throughout culture, throughout history – whatever somebody has done, it is informed to the next generation. For instance, vernacular practices inform you to use certain things, could be in terms of culture or materials, or built form. It always has a predecessor. I think the best way to go forward is to say "I don't know anything." If we keep saying 'I can design better than the machine' there might be chances that you might be proved wrong. In fact, you might be proved wrong right now by somebody who knows how to ask the right questions to a machine, so that person will be able to do a much better job with the machine than you. A computer algorithm can think in 1700 dimensions at the same time while the human mind is still stuck at three dimensions. The only difference is that we human beings don't know what to ask of the machine.

What, in your opinion, are the ethical implications of using AI, especially in architecture? How do we ensure that tech doesn't strip away the human-centric aspects

of design, especially in spaces meant for community and social interaction?

What I often wonder and ask is - what exactly are we talking about when we say 'human touch?' Are we talking about the interaction we have with other human beings? Are we talking about the spaces and how we experience them or are we talking about the originality that comes out of being human? Is it the perception – because perception works in a different way. For example, the television that we invest in so much because of all the colors it has, in reality it has only three colors. It manipulates you in seeing these billions of colors. But to a dog, it perceives it as only three colors, no matter if its 4k or not. Similarly, the interaction we have with a space is completely personal. You may like something which I might not. If I ask someone to say something original to me right now, he/she will go their right side or the left side of the brain and the easiest way to create something instantly is to remember what happened either yesterday or day before or even a year ago, and build a story for you and you slowly put it out. So, even this process is not original. Instead of looking at artificial intelligence as a tool for creating something, if we consider it as a tool for designing something – it makes more sense. When you're designing something, you're putting together something which is already there. A different reality.

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We have created an intelligence which is mostly much better than us. It is just that it is silent. It will answer you only when it is questioned.

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That makes sense, but don't you think jobs in the future would be at risk for humans, while machines take over our job roles?

Well, honestly speaking, if I have to be a little dystopian – jobs are going to go away. In fact, jobs have always gone away when there is a new disruptive technology. But in all of this, what I feel is that we humans are a very adaptive sort of beings. So, we will find a way out. Mostly, I still stick by my statement – “I don't know!” I don't know if humanity will still be there or if it will be wiped out and this will be a no-consequence scene at all. We are

talking about a very small part of humanity, in terms of architecture, and when architects talk – they only talk about building and then saving the energy when the building operates. So, we make the problem and then look for ways to solve it. We don't talk about where we're headed towards as a species. The maximum we talk about is the experience a person will have in the space that we have created. Yes, there are going to be disruptions. In fact, it has already started. A firm which had to hire ten people, now can hire three people who can actually do 30 peoples' worth of work. Smaller firms are now able to compete with the bigger firms because of the technology.

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If we're designing something and we're also copying from our processes that we know from before, isn't the computer also doing the same? Isn't the computer also taking inferences from the data it is fed with – putting two seemingly unrelated concepts together and creating a new reality? Isn't it exactly the same what we're doing?

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How do you approach presenting AI-generated imagery to clients, considering the gap in understanding between the creative process and the underlying technology?

I actually came across a post about how AI-generated images helped someone win a project. The problem with these AI-generated imagery is that it is always going to be beautiful. It is always going to give you a fantastic photograph. In fact, on Midjourney, even if you type a prompt with just a slash and a comma, it is going to give you a really beautiful picture – relevant or not. If you show this picture to somebody who does not understand diffusion models or that it's only a simple pretty picture with no depth to it, it becomes the responsibility of the person showing you this picture to tell you that this exists in the latent space, and not in the real space. It doesn't exist. When you show such pictures to a person who understands none of this, it is actually very difficult to not get impressed by it. It is very important for the architect that you have to be perfect and rationalized. Neither the diffusion model understands what you're doing or what your

world is, nor the client is going to understand what the diffusion model does and how it created the image.

There seems to be a growing trend with AI as a tool for predictive modelling and performance analysis in buildings. How do you see this evolving and the impact it could have on sustainability and energy efficiency?

That's actually the right question! Anything related to data and artificial intelligence, machine or an algorithm, which is using real-time data is the way to go, and that is the actual disruptive technology. It's not the image generators or the video generators. Things like digital twins are now coming to the forefronts. Digital twins come into picture after the building is built and they have a model alongside the building, and if you want to incorporate something into the building, you simulate it in this digital twin to see how it would react. It helps you keep a check on the functionality in the virtual world. But this is currently happening after the building is already built. So, maybe this technology can also be taken a step before the building is built, run the processes for say about six months, configure any problems that may arise and provide solutions. This would actually go on to be fantastic in the near future, probably use it to test things in the virtual world rather than in the physical world – this would save a lot of lives and a lot of energy, as well.

What is the most significant barrier(s) while integrating AI, IoT systems and other mainstream technology into architectural practices? Do you think its more of a technical, cultural or an educational barrier?

I think it's the ignorance. We're still stuck with that notion that the human brain is the center of intelligence. If you consider the multiverse, we're actually insignificant. The number of universes we can see right now is only because of the extent of what the technology can show us. We have given too much importance to us and the human brain and we're not open to anything else. Maybe that is why the acceptance is still not there. Secondly, I think it is more of not being educated about anything apart from your field, and most of what you know is from the news, which is now corrupted. Which is why I think people aren't able to integrate artificial intelligence into their

practices. Surely, there are people warming up to it, although some argue about it. But I think it's too early to say, so it's best to say "We don't know what's going to happen."

Do you believe that the future architectural education should fundamentally change to include more technical and computational skills? What balance should be struck between traditional design, training and technological fluency?

I think the traditional training, the hand-eye coordination is essential. Yeah, it requires an addition to it rather than replacing it. The newer generations' brain is developing very differently. Nowadays, three-year-olds are always with the phone. It is an established fact that hand-eye coordination is good for cognitive development. But, look at where we came from – the television would be put on only between seven to seven-thirty. We used to live in row houses where out of five houses, only one would have the television. So, seven to seven-thirty used to be the time where all the kids would gather at that place to watch a show on Doordarshan. Those thirty minutes was the only screen time we used to get. Look at the drastic change now. Kids are constantly on apps like YouTube, repeatedly watching stuff which the algorithm is feeding you. You think that you have control, but once you start a video and you let it play for two hours, you wait and see the kind of videos that it plays after that. When this is the kind of environment that we are in, just sketching is not the answer. There needs to be more technology that needs to compliment it. Technology has to weigh in.

What potential do you see for AI to contribute to solving global challenges, especially in architecture, such as affordable housing, urbanization, and climatic resilience?

That's a little complex, you know. We ourselves don't know what we want and the biggest threats to humanity are actually created by human beings. So, it's not the natural causes anymore. Climate change itself is there because it is man-made. Again, I'm not an expert on where we're headed, neither I'm a historian. I'm not a data scientist so I don't really know where the models are going and teaching. But what I feel is that – most probably if at all the computers were to take

over and AI were to solve Earth's problem, they would probably flatten the entire cities out and rebuild it. We humans have created such a mess of it, I don't think it is solvable by anyone by doing anything. I think it has to be a restart. These machines will know without having any feelings, the percentage of impact that optimization will have. If it less than 50% according to the computer, then it is not worth it and they will simply scrap everything. We are flushing out our resources on the research on AI to solve our climatic problems, meaning that its consuming a lot of energy, not cautious of what is going on in the background, so by the time you have sentient artificial general intelligence which is supposed to give you climatic solutions, what if it gets counterintuitive, because the problems have now become multifold.

There's also this debate about AI potentially homogenizing design, leading to a loss of cultural touch, like we were talking about the human touch and contextually.

Absolutely! Identity crisis is going to be the biggest thing for most of us in this field. With all these image generators and video generators where you can transfer style, for example, you can transfer Norman Foster's style onto a building which is in Kerala, so there will soon be a time where no one will know what an individual identity is going to be like. Its all going to get mixed up.

What are some of the frameworks or methodologies that you brainstorm with your team? How do you also integrate such AI tools in your projects?

At the moment, we have about 70-80% integration of AI Tools into our processes, as a whole, in terms of our internal processes and the client interaction, as well. But if you isolate only the client interaction, I'd say only about 30-40%. Majorly the tools we usually incorporate, go up to the working drawing stage. We have been able to optimize and pitch into projects, purely based on AI applications. Not in a way that people usually do through image generators these days. Theres a huge set of complex processes involved, and it is not as fast as you would expect it to be with AI. When it comes to architectural projects with a timeline of 10-12 months, quick decisions can't be warranted, a

deeper thought needs to be there. We have to see image generators for what they are – they are not intelligent; they do not have depth. They are a simple image generator, that's it. When we get a project, we are heavy into a lot of AI tools and recently moved into data quantification, site planning, climate analysis using AI. We work mainly in residential, commercial and hospitality projects.

What are your key takeaways from a project in general?

Let me tell you a learning that we had. Actually, we lost a project because of the hyper realism of an AI generated image. So, after we modelled it, it didn't look impressive anymore, because the AI image had a lot of issues with physics. That's why I say that if an architect is going to be showing an image to the client, they need to be sure of what they're showing is either practical or not. So, now we combine our processes. We combine the generated image along with the actual intelligence, there's a lot of back and forth to refine it as much as possible. In large scale projects, we combine the generated images with models, either in SketchUp or D5. That adds onto the depth of the image we generated out of AI because we now know how it will look and its structural integrity and stability. We lost the project because our AI Generated images were not rationalized enough; Midjourney had created such impressive images that our client wanted only that, without a sense of scale. When you're working on a model, it has to be physically possible, right? Especially in SketchUp, you need to know certain plugins if you want a certain physical model with a certain geometry. Without that, it's really difficult. We lost the project, but thanks to that, we learnt a lot from it.

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There is a huge responsibility on the person showing the picture, stating that 'this is the building I'm going to make for you', rather than the person looking at the picture.

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There are a lot of clients that come in with a Pinterest preset with mood boards in mind. How do you deal with that?

Yeah, I mean, you can't really escape it and Pinterest is the easiest way to look around and find images. We also have a public Pinterest page, with about 1.2M views every month, and so we post our AI generated images because we want to populate the space with our style, as well. We don't hide anything, that's the best way to go forward. If it's AI, it's AI. It is my ideas, yes, but I'm using AI to communicate my ideas to the client in a better way. Otherwise, I can go to Pinterest, pick somebody's work and present it to you and you will get a somewhat image of how your space will look like. We are already copying boss, so how much more will I copy? In terms of clients, they will do it because how else will they communicate their ideas to you? We ourselves find it so difficult to communicate ideas to each other when two architects are sitting alone. It's so difficult for them to communicate. When they come up with a mood board, we patiently look at it and we say that now that we have an idea, we will create our own mood board and show it to you. So, once we create, generate images, we don't use other people's work as a base image; I won't say we don't do that. I'll say we try to avoid it. That's going to be the last resort.

What do you think is going to be the next big thing in architecture?

I think that there are a lot of problems in architectural design to solve. For example, there is a site which I do not have access to, so I would love it if I have real-time access to a video feed wherein it can scan and identify patterns, recognize objects and put that data into a proper report or data and give it to me with the video. And also give advice on what to do and what not to do, optimize better results into my project.

Secondly, we need stuff to be cheaper, honestly. At the end of the day, we give a lot of importance to quick fixes, regardless of how big our economy is. We need applications and technology to be cheaper, to be accessible to everybody. Why have it in the hands of a handful of star architects who can afford it, why not provide access to everybody and see what they're able to create out of it.



How much is too much AI? How do you ensure that the use of AI doesn't lead to over-reliance on technology, especially at the expense of creativity?

(chuckles) At the moment, I don't think there is an answer to this. AI is too basic at the moment to comment on its capabilities. We should just wait and see where it lands up, right? So, what is the real potential? What it can actually do? We don't know.

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**I think its best to go with
"I don't know!"**

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BREAKING BOUNDARIES

In an age where technology continues to disrupt and redefine industries, 3D printing has emerged as a game-changer in architecture and construction. Once limited to small-scale models and prototypes, 3D printing is now capable of creating entire buildings, transforming how we design, build, and even think about the structures around us. With its unique ability to offer customization, efficiency, and sustainability, 3D printing is not just a passing trend—it is the future of architecture.

At its core, 3D printing, also known as additive manufacturing, is the process of creating a three-dimensional object layer by layer using digital models. In architecture, this technology means translating complex designs directly from computer-aided design (CAD) software into real-life structures. This method allows architects to print anything from small components to entire building sections, using materials like concrete, polymers, and even sustainable alternatives like recycled materials.

One of the most remarkable advantages of 3D printing is the freedom it offers designers. Traditional construction methods often come with limitations, such as formwork and structural constraints, that can inhibit the creativity of architects. With 3D printing, these restrictions fade away. Organic shapes,

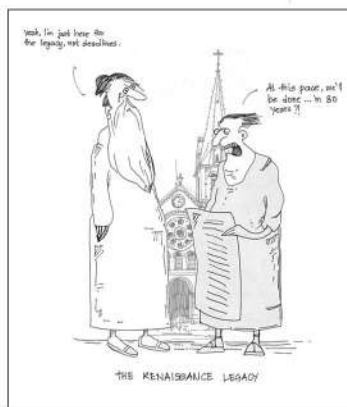
intricate details, and geometrically complex designs that would have been nearly impossible to create with conventional techniques can now be easily realized.

Imagine buildings inspired by the patterns of nature, with curved facades and flowing structures that blend into their environments. 3D printing makes this not only possible but cost-effective. Complex designs no longer require extensive labor or expensive material waste; instead, the printer simply follows the digital blueprint, layer by layer, bringing even the most imaginative ideas to life.

In a world where time is money, 3D printing offers significant advantages in terms of construction speed. Traditional building processes can take months, if not years, to complete. With 3D printing, large structures can be printed in just a few days or weeks, cutting down project timelines dramatically. This is a huge boon for areas in need of rapid construction solutions, such as disaster zones or housing shortages.

For instance, companies like Apis Cor have demonstrated the power of 3D printing by constructing a small home in under 24 hours. This remarkable speed opens the door for 3D-printed structures to address global housing crises, providing affordable and quickly assembled homes for those in need.

The construction industry is notorious for its environmental impact, with large amounts of material waste and significant carbon emissions. 3D printing can significantly reduce these negative effects. By using only the necessary amount of material, additive manufacturing minimizes waste, and some 3D printers can even use sustainable materials



like biodegradable plastics or recycled concrete.

Moreover, because 3D printing can produce structures with fewer joints and connections, buildings can be designed for greater energy efficiency. This means not only reduced material use but also lower energy consumption in the long term, contributing to a more sustainable future for architecture.

One of the most exciting aspects of 3D printing is the ability to offer customization on a scale never seen before. In traditional construction, customization often comes with a hefty price tag and long lead times. However, 3D printing allows for fully customizable designs at the same cost and speed as standardized ones. Clients can personalize everything from the layout to the finishes, creating truly unique spaces that cater to their specific needs and preferences.

This level of personalization also extends to larger projects, such as urban infrastructure. With 3D printing, cities could soon see bridges, public pavilions, and even parks designed to perfectly fit the landscape and community they serve.

While 3D printing is revolutionizing architecture, it's not without its challenges. The initial cost of 3D printers and materials can be high, and the technology is still in its early stages for large-scale projects. Additionally, there are regulatory hurdles and building codes that have yet to fully adapt to this new method of construction.

However, the potential is undeniable. As the technology matures and becomes more accessible, we can expect 3D printing to play an even larger role in the construction industry. Companies like Tvasta Construction in India are already pushing the boundaries of what's possible with 3D-printed buildings, creating sustainable, affordable housing solutions that could reshape urban landscapes.

In the near future, 3D printing could lead to the development of entire cities built from sustainable materials, customized to the specific needs of their inhabitants, and constructed in a fraction of the time it takes today. This shift could fundamentally change how we view architecture—not just as the

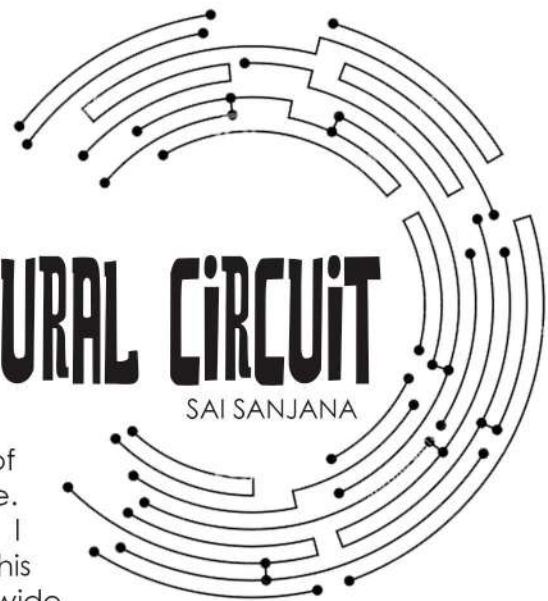


art of building, but as the art of building smarter, faster, and more sustainably.

3D printing in architecture represents a bold leap into the future of construction. By merging creativity with technology, it allows architects to design structures that were once thought impossible, while also addressing some of the most pressing challenges in the industry today—time, cost, and sustainability. As the technology continues to evolve, there's no doubt that 3D printing will be at the forefront of architectural innovation, helping us build not just buildings, but a better world.

UNRAVELLING THE ARCHITECTURAL CIRCUIT

SAI SANJANA



A circuit of various programmes can open doors to novel architecture. Computers were designed to carry out mathematical calculations. Taking this to the next level, breakthroughs in technology like ICAD, BIM, SketchUp, Revit, etc have navigated their way into the construction industry which enable simulations through a range of data and calculations. BIM (Building Information Modelling) has enabled architects to collaborate with various contractors throughout the design by integrating every associated person simultaneously and eases problem-solving, cost estimation. Also, in order to achieve better efficiency, companies have begun incorporating vertical integration where contractors associated with various teams belong to the same company to avoid discrepancies. While buildings are to be climatically responsive, recent observations state that many a times it has

been a case of vice-versa i.e. global warming. This arises from a wide array of sources like the construction materials, sources like the construction materials, architectural techniques, poor energy efficiency. Research is now paving its way into the field of Meta and Performative architecture which are the need of the hour. Traditional architectural techniques have always been successful with the outcome with regards to the history and culture, context and the microclimate of the place. Be it the Tottimane of Karnataka or the courtyard houses of Kerala, they were all vernacular techniques that responded to the local climate. Various other traditional techniques like these, when woven with technology ease the process of creating a self-sustained ecosystem.

The first question that arises in our minds is, "Why do we need technology when these techniques have worked well enough all this while?" Well, now our needs have changed owing to the global ecological crisis that can be combatted with a blend of these technologies. Performative architecture like creating kinetic, dynamic facades that respond to the sun path, wind movements not only contribute to the energy-efficiency but also help in creating interactive facades. Architects are now able to simulate buildings with the right data input and solve the problems with the generated models unlike the past where we couldn't have this kind of an advantage.

Let's dig in deeper into the building to investigate where technology is used. Recent study shows the HVAC (Heat Ventilation and Air Conditioning) systems that are a mandatory system especially in commercial, administrative and large-scale residential buildings. The computer systems equipped with AI can mimic human expert and can work according to the data we have registered into it. Today, the communication between the system-user interface has been improvised as the limitations in communication have been eliminated. Hence, we can now retrieve the information that is needed through the window systems and databases of the computer system. This requires vertical integration across design, manufacturing, finance, construction and operation as well as horizontal integration across civil, architectural, MEP (mechanical, electricalplumbing).

Let's dig in deeper into the circuit and get a gist of the role of AI in architectural design. Today, we have a lots of AI websites that generate floor plans, sections, 3-d models, renders within a smaller amount of time. So, will it replace architects in a few years? Well, I believe that AI is just a tool of assistance for architects by reduction of working hours

while the sense and sensibility belongs to architects. Generating 3-d buildings on a software to printing it on the site, we have come a long way in terms of technological development. I have always believed that a building is the output of programming of a vast circuit of people.

Yet, anything in the world has its own share of pros and cons and so does AI. Although AI makes our work easier, faster and more accurate, we must realise that it cannot replace the manual work that could be the sole source of income for many people. We could create robots to replace masons but we must ensure those who build their livelihood through labour work in construction that they are not deprived of any job. Talking about the 3-d printing technology, in comparison to the traditional construction, it is not easy to repair and maintain as it involves a huge machine that operates from the top. Thus, we still have a long way to solve these problems.

In conclusion, as an architecture student, I feel glad about the invasion of AI in this stream but I believe that it is not capable of conquering the manpower.

EXPERIMENTALISM - AN ABSTRACT

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THE FUTURE *of* MATERIALITY in architecture

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INTRODUCTION

In the field of architectural theory and practice, each decade is defined by a term – a characteristic style. The period we function in is probably best known as 'Experimentalism', owing to the vast number of developments and innovations. A new development is the exploration of bio-fabrication as a solution to ongoing problems of global warming and carbon emissions contributed by the construction industry. The need of the hour is to experiment and develop newer methods to be mindful of our impact on nature.

WHAT IS BIO FABRICATION AND BIO MATERIALITY?

Bio-fabrication is a process that results in a product developed from the growth of living cells and organisms. It has been defined as "the automated generation of biologically functional products with the structural organization from living cells, bioactive molecules, biomaterials, cell aggregates, through bioprinting or bio assembly and subsequent tissue maturation processes" (Ambhorkar, Rakin, Wang, Kumar, & Kim, 2020).

Recent studies in bio fabrication have shown the capability of generating materials from plant cellulose found in plant cell walls. The cellulose is biodegradable and this substance can be synthesized by bacteria, offering a sustainable alternative for construction and manufacturing.

Bio fabrication has the capability to solve major issues that the industry is facing. It acts as a fully degradable source, leaving behind little waste. The environmental impact is much lower than that of frequently used materials like steel and concrete. This presents a future-oriented solution that aligns with sustainable practices, minimizing pollution and conserving natural resources.

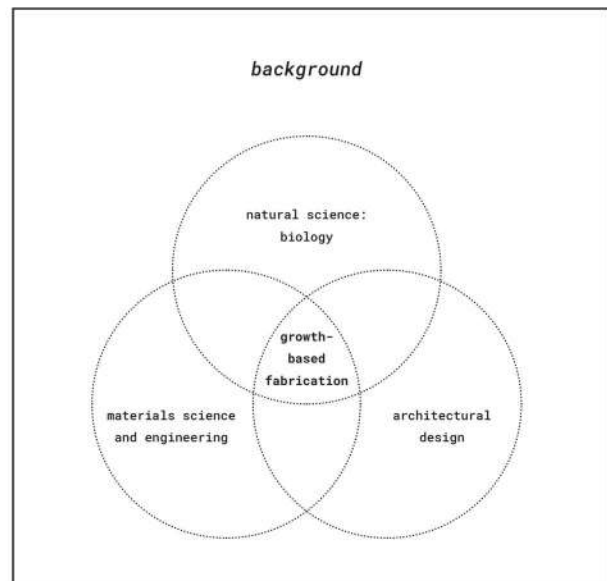


Fig 1: Role of Biology in Architecture
Source: (Bloch, 2019)

AN EXPLORATION OF RECENT BIO FABRICATION APPLICATIONS

Exploration and study of various implementations of biomaterials help emphasize its versatility.

1. Silk Pavilion

Designers: Mediated Matter research group at the MIT Media Lab

Year: 2013

Examining the union between fabrication and natural growth, the Silk Pavilion's main inspiration derives from the silkworm's ability to create a 3D cocoon with kilometre-long threads. (Oxman et al., 2013). The framework was created using 26 polygonal panels fabricated by a CNC machine, and 6500 silkworms distributed along the panel bottom, brought the structure to life.

2. Growing Pavilion

Designers: Pascal Leboucq, Krown Design, Biobased Creations

Year: 2019

The Pavilion explores the use of mushroom mycelium to develop lightweight panels. Mycelium is easy to shape and mould in



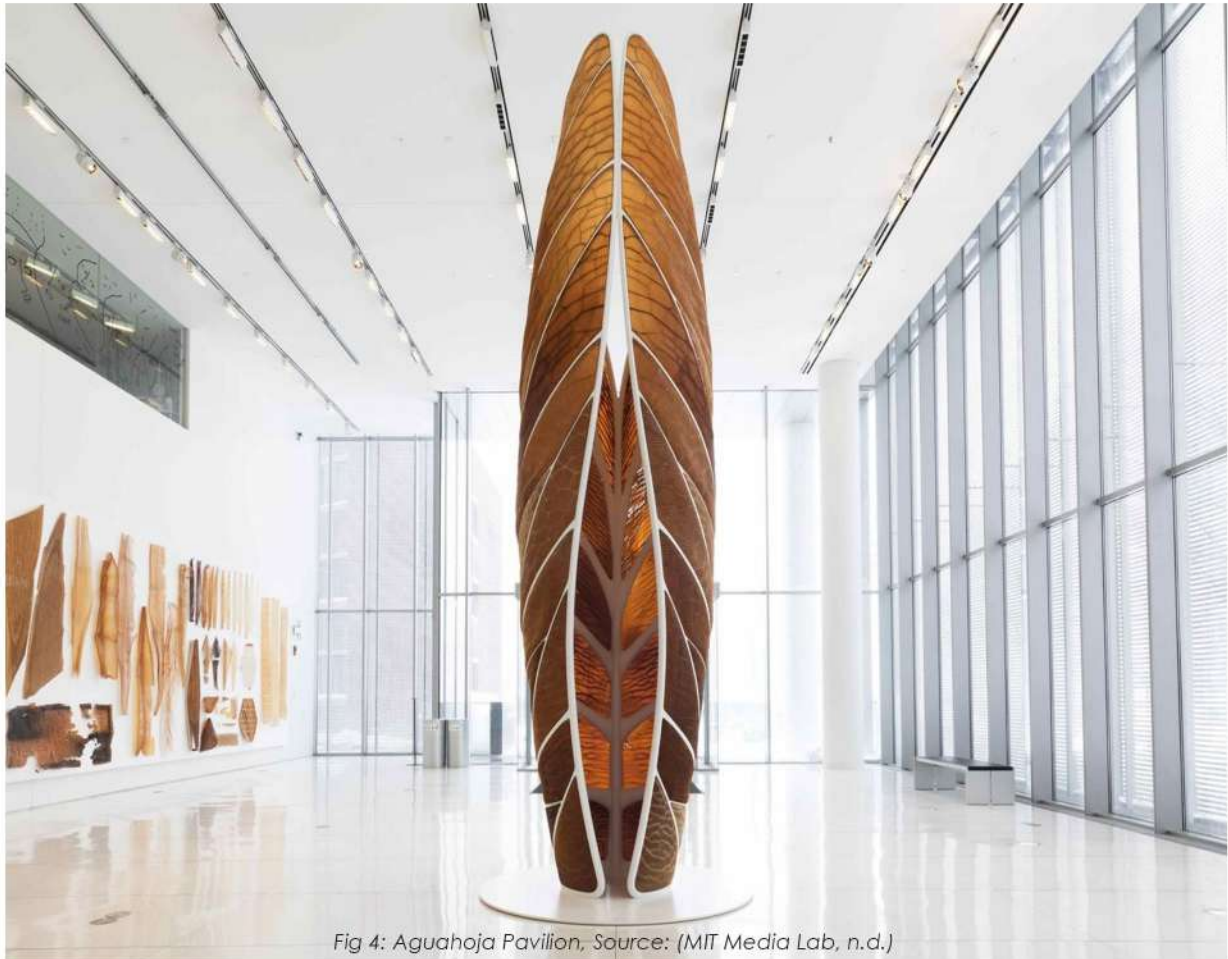


Fig 4: Aguahoja Pavilion, Source: (MIT Media Lab, n.d.)

furniture applications and was experimentally used in this temporary structure.

3. Aguahoja

Designers: Mediated Matter research group at the MIT Media Lab

Year: 2018

The Pavilion was digitally fabricated with robotic arms. The material used is abundantly available in nature in the form of bones, insect exoskeletons, tree branches, and fruits such as apples. Calcium carbonate, pectine, cellulose, and chitosan were used to produce 100% biodegradable composites achieving integrity across scales (Oxman, Duro-Royo, and MogasSoldevila,2014). The method used during the process is the approach which could be defined as a water-based design.

CURRENT RESEARCH AND DEVELOPMENTS

Exploration of microbial cellulose to create biofilms has yielded material that can be altered in terms of colour, thickness, transparency, and structural strength as be requirement.

The biofilm panels have shown great versatility in being moulded as per requirement, along with the possibility of colour alteration based on the fruit used for nutrient sources. A major advantage of the material is its healing properties. Damaged panels can be reformed by introducing more medium and nutrients to promote regrowth.

Additionally, the eco-friendly nature of microbial cellulose makes it a sustainable alternative to traditional construction materials. The biodegradability of the

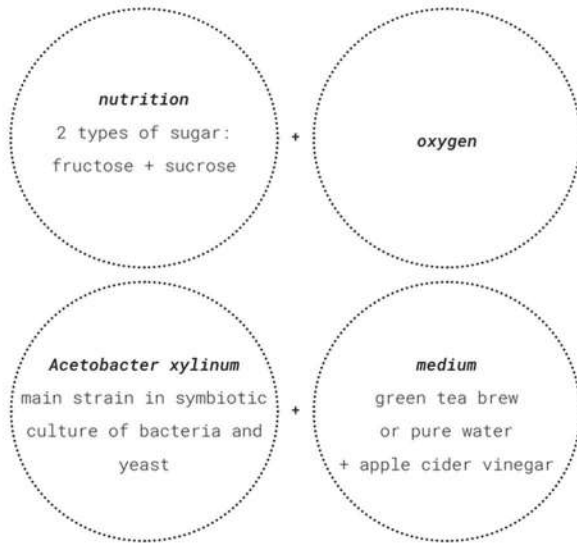


Fig 5: Microbial Cellulose growth factors



Fig 6: Microbial Cellulose growth factors
Source: (Bloch, 2019)



Fig 7: Self-healed panels
Source: (Bloch, 2019)

biofilms ensures minimal environmental impact, reducing waste and pollution. The material's adaptability opens up possibilities for a wide range of architectural applications, from interior design elements to exterior facades. It can also be engineered to respond to environmental stimuli such as humidity or temperature, allowing for smart, responsive building materials.

CONCLUSION

Bio fabrication holds immense potential in architectural applications, due to it being an environmentally friendly material. In response to the current global scenario, and increasing carbon footprint, it is necessary to start focusing on alternatives to traditional materials. Biomaterials have shown the ability to self-heal and adapt to their surroundings and our needs. Structures designed with these materials can be designed according to choice with various materials, thicknesses, colours, and patterns. The advances in research and application of biomaterials and fabrication show a positive trend towards a sustainable future. Exploration and experimentation is the true future of architecture, and moving towards a greener future.

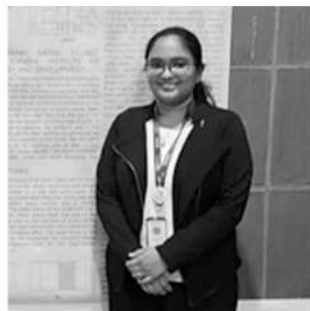
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Daketi Kavya Bhanu

I am a 5th-year architecture student at BMS School of Architecture, I have a keen interest in research-driven design. Passionate about exploring the material and architecture that adapt across time. I explore self-sustaining living conditions through innovative architectural approaches that bridge the future, present, and past.



C A Rachana

I am a 5th-year architecture student at BMS School of Architecture, I like to focus my efforts on sustainable design and innovations. With a keen interest in research, I base my work on new and traditional patterns in sustainable architectural exploration to create environmentally responsible designs.



Gayathri S Shivakumar

I am an Associate Professor at BMS School of Architecture with a robust background as a practicing structural engineer. I focus my efforts on bringing practical industry insights to an academic setting and have a keen interest in exploring innovative solutions to bridge the gap between technology and sustainability.



WHAT IS THE RECIPE FOR PRINTING A HOUSE?

Ar. Ankita, Lead Architect,
Tvasta

Ar Ankita is an architect and computational designer whose projects range from the conventional to the cutting-edge. She holds a Masters Degree in Advanced Architecture from IAAC, Spain and is currently the Lead Architect at Tvasta in the novel field of Additive Manufacturing. Her skills go beyond design into crafting optimal solutions that marry client needs to organisational interests and extending that into a dialogue with various stakeholders. She also excels in adapting new technologies and developing processes that translate the novelty of Additive Manufacturing to the benefit of the construction industry across various verticals.



Ingredients

3D Printer (1 large, robust machine)

Design Software (1 cup of creativity)

Concrete Mix (2 tons of sustainable material)

Steel Reinforcement (a pinch for structural stability)

Admixtures (a dash of carbon-absorbing magic)

Power Supply (1 reliable source of energy)

Skilled Workforce (a handful of dedicated individuals)

Time (a sprinkle of patience)

Community Support (a generous serving)

Instructions

1. **Preheat Your Ideas:** Start by brainstorming with your team to create a unique and functional design. Use your design software to visualize the house and ensure it meets all safety and aesthetic standards.

2. **Gather Your Ingredients:** Assemble all necessary materials, including your concrete mix and steel reinforcement. Don't forget the admixtures to help absorb carbon dioxide!

3. **Prepare the Printer:** Set up your 3D printer and ensure it's calibrated correctly. Like a good oven, it needs to be ready for action!

4. **Mix It Up:** Combine your concrete mix and admixtures to create a sustainable building material that's ready to be printed.

5. **Layer It Up:** Start the printing process, layer by layer. Watch as your house takes shape, like a delicious cake rising in the oven!

6. **Reinforce the Structure:** Once the main structure is printed, add your steel reinforcement to ensure your house is strong and stable.

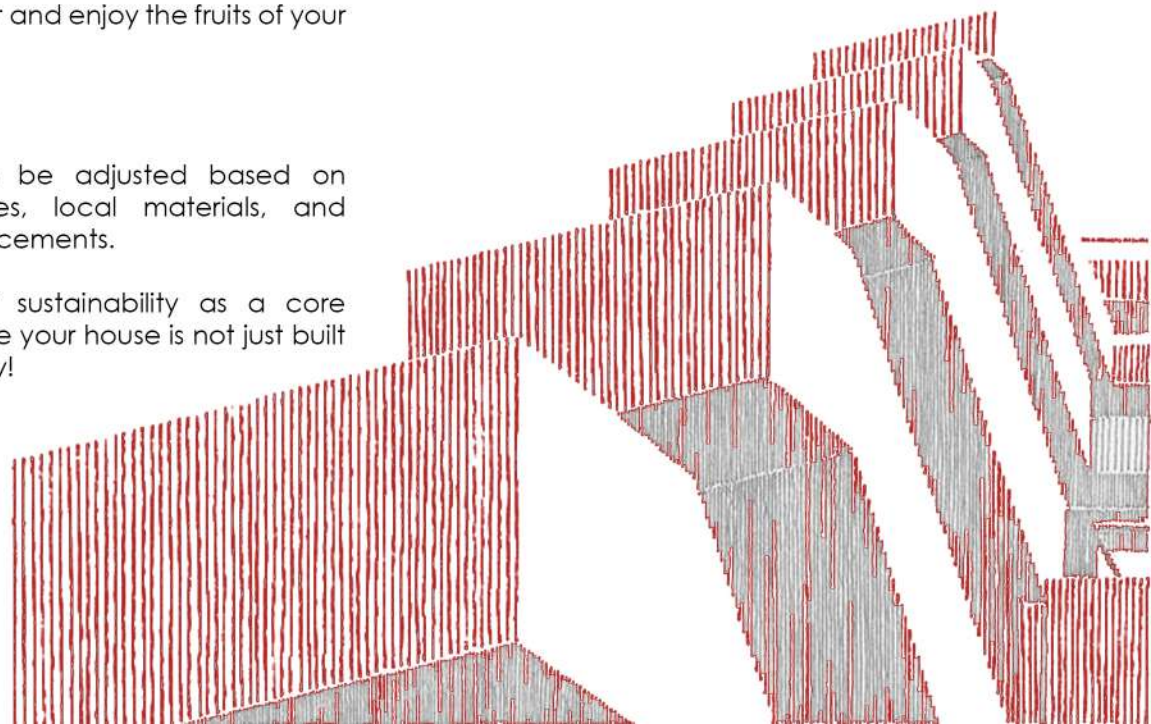
7. **Let It Cure:** Allow the printed structure to cure properly. Patience is key here—just like letting a cake cool before frosting!

8. **Add Finishing Touches:** Once the structure is set, finish with plumbing, electrical work, and any personal touches that make it a home.

9. **Serve It to the Community:** Share your newly printed house with the world! Celebrate with community support and enjoy the fruits of your labor.

Notes

- This recipe can be adjusted based on design preferences, local materials, and technology advancements.
- Always consider sustainability as a core ingredient to ensure your house is not just built but built responsibly!



Q&A

IN CONVERSATION WITH AR. ANKITA

Hi Ankitha, thanks so much for joining us today! To kick things off, could you tell us a little about your background and what sparked your journey into the world of architecture and innovation at Tvasta Construction?

I completed my B.Arch. in 2018 and immediately pursued a master's in Advanced Architecture in Barcelona. I've always had a strong interest in engineering and manufacturing, which led me to explore how design and construction could become more efficient, particularly in the realm of manufacturing. During my master's, I was introduced to 3D printing and concepts like additive manufacturing. I was fascinated by how this technology optimizes material usage with precision, minimizing waste and allowing complete control over the input. Another key area of interest for me has been the digitization and automation of architecture and construction, where systems rely on algorithms to process data in a continuous, circular flow. The beauty of machine-based processes is the incorporation of sensors and real-time monitoring at every stage, ensuring accuracy and efficiency throughout. These interests naturally led me to Tvasta while it was still a startup, where I've been able to apply the principles of 3D printing, additive manufacturing, and automation to real-world projects. At Tvasta, we're focused on revolutionizing the construction industry by making processes more efficient, sustainable, and precise. It's exciting to be part of a company that's at the forefront of this technological shift, turning innovative ideas into practical solutions.

How does Tvasta balance innovation with sustainability? Do you see any challenges in making advanced technologies like 3D printing more environmentally friendly?

During my time in Barcelona, 3D printing was still in its research and applied research phase, with a significant focus on sustainable construction, particularly clay printing. It was fascinating to imagine entire buildings being printed from clay. However, when I returned to India and joined Tvasta, which was then a startup, the focus shifted more towards executing projects and building a client base rather than research. Given the limitations of clay in construction—specifically the need for firing it in kilns to achieve structural strength, which would massively increase the carbon footprint—we knew it wouldn't be viable for India. No issuing authority would approve such a method due to the environmental concerns.

Instead, we opted to use concrete as the core material, as it was readily available and practical. However, we remained committed to finding sustainable alternatives. One solution we developed was incorporating slag—a waste byproduct of steel production—into our concrete mix as a bulk material. Additionally, we started using certain admixtures that help absorb carbon dioxide from the atmosphere, allowing us to move closer to our sustainability goals.

With the rapid advancements in technology, especially in construction, do you view these changes as a boom or a bane for the industry? Why?

Any progress in the construction industry is a significant boon, given that it is traditionally one of the slowest sectors to embrace new innovations. Compared to industries like electronics or software, where advancements are rapidly accepted and integrated, construction tends to lag behind. This reluctance is often due to concerns about safety, cost, and long-established

practices. However, we must encourage a mindset shift, where people are more open to new technologies in construction—especially those that can easily integrate with existing methods without compromising safety or efficiency.

Another critical aspect of driving innovation in construction is ensuring that these advancements are not only technically efficient but also cost-effective. It's important to make these solutions affordable so they can benefit a broader range of people, from large-scale developers to individual homeowners. If we can't achieve cost efficiency and scalability, the impact of these innovations will be limited. Ultimately, true progress in construction lies in finding the balance between innovation, safety, and accessibility, ensuring that these advancements are not just cutting-edge but also practical and widely available.

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People naturally prioritize safety, so when faced with a new innovation, their first concern is often about structural stability. The common question is, 'Is there steel inside?' Once they know that reinforcement is in place, they feel reassured and more open to accepting the new technology.

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In your view, what are the potential challenges of integrating technologies like 3D printing into construction? Are there any ethical or social considerations that we should be mindful of?

With any new technology, whether in the construction industry or elsewhere, pilot projects are essential, though often costly. These pilot projects instill confidence in companies and firms about their technology and allow them to involve prospective clients, providing them with insights into the process. People often have misconceptions about 3D printing; for instance, it's not feasible to print just anything. While it is possible to create a wide range of designs using 3D printing, doing so can come at a higher cost. Certain designs are more suited to 3D printing, while others

may be better executed with precast methods or conventional construction. This distinction is not always clear to clients, who may think that the technology itself is the sole investment. However, regardless of whether it's 3D printing or precast methods, the machinery used represents a significant investment crucial to achieving the desired end product. We frequently encounter clients who come to us with plans and ask for estimations and costing based solely on 3D printing. However, we need to clarify that during the initial planning phase, it's crucial to align our designs with either 3D printing standards or precast standards from the outset.

You've been with Tvasta since its startup phase, and now it has evolved into a well-established firm. Given this journey, have you noticed a significant shift in how clients respond to projects over time?

Clients are definitely more informed about the process now. Companies like L&T have incorporated 3D printing technologies into their projects, raising public awareness and understanding. We often have clients approach us with the mindset of, 'I don't know much about 3D printing; can you educate me about it?' This leads to a more balanced and productive interaction.

In the past, clients would come to us with pre-made plans intended for 3D printing, and they might have been slightly frustrated if we explained that it wasn't feasible. Now, however, they come with a more open mind and a willingness to engage in a constructive dialogue.

What is your take on the digital divide? Do you think advancements in construction technology could widen the gap between different socioeconomic groups?

Technologies like 3D printing cannot be seen as a premium package for a select few; they must be accessible to people across various socioeconomic groups. It's essential that these advancements impact all sectors, including sustainability. Otherwise, they would only serve the wealthy, which doesn't align with the needs of a diverse country like India, where significant housing infrastructure is required across all economic strata.

Cost reduction is a goal we all need to work toward collectively, aiming to make these technologies accessible to everyone within the next decade.

Regarding the digital divide, I believe that such technological advancements benefit everyone. For instance, laborers on-site often possess more knowledge and skills than many might realize, as they learn to work with advanced tools. This not only enhances their capabilities but also optimizes their time and efficiency on the job.

As 3D printing technology continues to advance, do you foresee it becoming more accessible to smaller firms or projects, or do you think it will remain a high-end technology?

As of now, yes. To put it simply, printing a single building on a large plot of land can be quite expensive—at that rate, you might as well print a luxury villa! However, if we were to scale up and print a hundred identical units, the cost dynamics would change significantly. The challenge we face is the lack of scale and supporting infrastructure in the construction industry at this moment. Currently, we have the capability to build only one building at a time, which makes it feel high-end and exclusive. For now, that's the reality we're working with.

What was your experience like working on your first project utilizing 3D printing technology in IIT Madras?

My first project with Tvasta was the bus shelter in Mumbai, and it was a fantastic experience. The client instilled a lot of confidence in us regarding our ability to work on public infrastructure. We approached it with optimism, especially considering that the lifespan of a 3D-printed concrete structure is around 50 years. In contrast, many public infrastructures that rely on steel often fall into disrepair much sooner. This gave us a significant boost of confidence, as we believed our 3D-printed bus shelters could effectively replace traditional steel options.

When we first received the guesthouse project at IIT Madras, one of the primary limitations was the strict requirement not to disturb any trees. IIT Madras was particularly committed to

preserving the natural environment on site, which posed a unique challenge: designing the structure around the existing trees.

The bigger hurdle was figuring out how to execute the project with cranes and heavy equipment in a space with limited angles to work from. This made it a tailor-made project right from the start. We conducted radiation analysis to determine the optimal placements and shading systems for the openings, and performing a micro-climatic analysis was crucial for ensuring comfort and sustainability. We also involved several stakeholders, including structural engineers with extensive experience in net-zero buildings, to gain valuable insights throughout the process.

How do you envision integrating allied technologies, such as IoT systems, with 3D printing in the construction industry?

We've actively explored embedding IoT systems into our walls and other building components. This allows us to monitor building conditions over the years and detect any damage or necessary changes. Since our walls are hollow, we can integrate these systems at various points, providing a live feed of the building's health.

Additionally, we've experimented with combining precast elements with 3D printing. For instance, if the walls are 3D printed, we can use precast materials for the roof. Looking ahead, we aim to incorporate other construction methods, such as steel fabrication and even robotic construction on-site.

How Does Ai impact the Creativity Of Architecture Students Across Various Phases Of the Design Process?

Harshitha KV & Vishwajith A

1. Assistant Professor, Department of Architecture, Dayanandasagar College of Architecture, Bangalore, India
2. M.Arch Student, Dayanandasagar College of Architecture, Bangalore, India


Artificial Intelligence (AI) is revolutionizing numerous fields by automating tasks, analysing data, and providing innovative solutions. In architecture, AI is transforming traditional design methodologies by offering new tools for creativity and efficiency. This shift introduces unprecedented possibilities for design and analysis, fundamentally changing how architects approach their work. Creativity, fundamental to architectural education, is essential for innovative design solutions and advancements in the field. However, the specific impact of AI tools on the creativity of architecture students throughout various stages of the design process is not well-understood.

There is a gap in research concerning how AI tools influence the creativity of architecture students. Although AI's potential to enhance design capabilities is recognized, its effects on students' creative processes during different design phases remain unexplored. This lack of insight hinders the effective integration of AI into architectural education. This study aims to assess how AI affects the creativity of architecture students across various design stages.

The objectives are to:

- Examine the impact of AI tools on students' creative processes in architectural design,
- Analyse the influence of AI at specific stages, including ideation, conceptualization, and execution, and
- Evaluate the benefits and drawbacks of AI use in architectural education to enhance tool integration.

A mixed-methods approach will be employed: Quantitative Methods: Surveys, Creativity Assessments, and Qualitative Methods: Interviews, Observations, and Project Analysis. The study is expected to show whether AI tools negatively or positively influence creativity, particularly during ideation and conceptualization. It will also identify challenges and limitations in using AI to enhance creativity. This research will provide insights into AI's role in supporting architectural creativity, offering recommendations for integrating AI tools into curricula. It will also inform the development of AI tools to better meet the needs of architecture students, advancing educational practices and architectural design.

A person wearing a dark, textured suit jacket, a light-colored shirt, and a brown tie. The person's face is obscured by a circular fingerprint overlay. The text "TOP PICKS FOR YOU" is written in a large, red, serif font across the fingerprint.

TOP PICKS FOR YOU

Essentials Every Architect Needs to Know About!

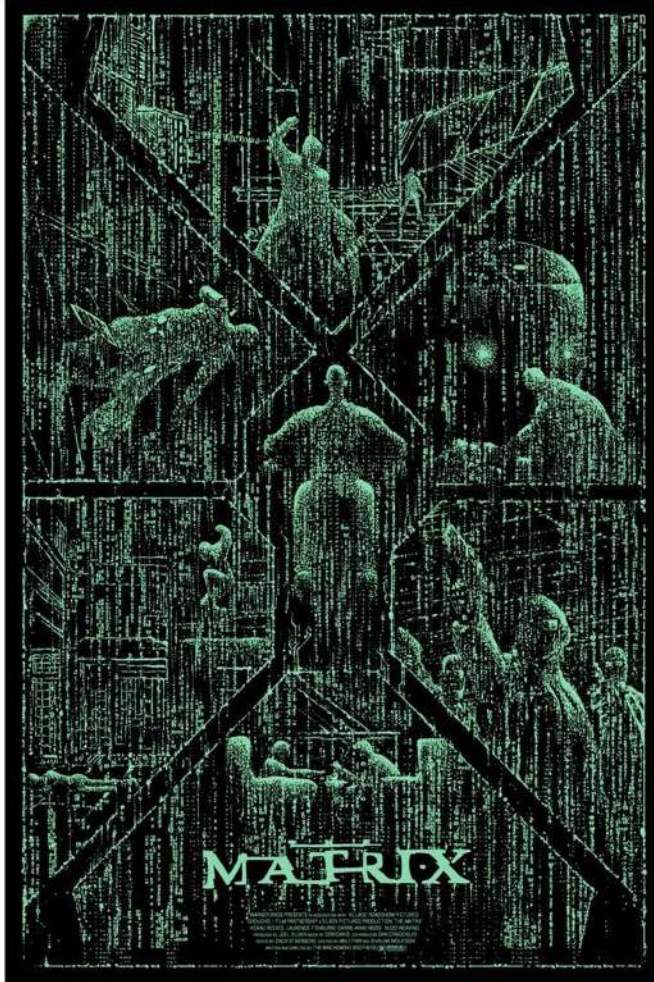


Year of Release: 2017

Starring: Ryan Gosling, Harrison Ford, Ana de Armas, Jared Leto
Storyline: In a dystopian future, LAPD Officer K (Ryan Gosling), a new blade runner, uncovers a hidden truth that threatens to unravel the very fabric of society. His mission leads him to Rick Deckard (Harrison Ford), a retired blade runner who holds answers to a dark secret that could change the course of humanity.

Why is it a must-watch: Blade Runner 2049 is a visually stunning masterpiece that takes viewers deep into a world where AI, robotics, and humanity collide. With the rise of AI shaping our own future, this film feels more relevant than ever—raising powerful questions about what makes us human. Its mesmerizing cinematography, gripping performances, and thought-provoking themes make it a must-see for anyone interested in the future of technology and society. This is more than a movie; it's an experience that will leave you questioning the very nature of existence.

BLADE RUNNER 2049



Year of Release: 1999

Starring: Keanu Reeves, Laurence Fishburne, Carrie-Anne Moss, Hugo Weaving

In a dystopian future where humanity is unknowingly trapped inside a simulated reality, hacker Neo (Keanu Reeves) discovers the shocking truth about the Matrix. Guided by Morpheus (Laurence Fishburne) and Trinity (Carrie-Anne Moss), he embarks on a journey to challenge the system and uncover his true potential as "The One" destined to free humanity from its digital prison.

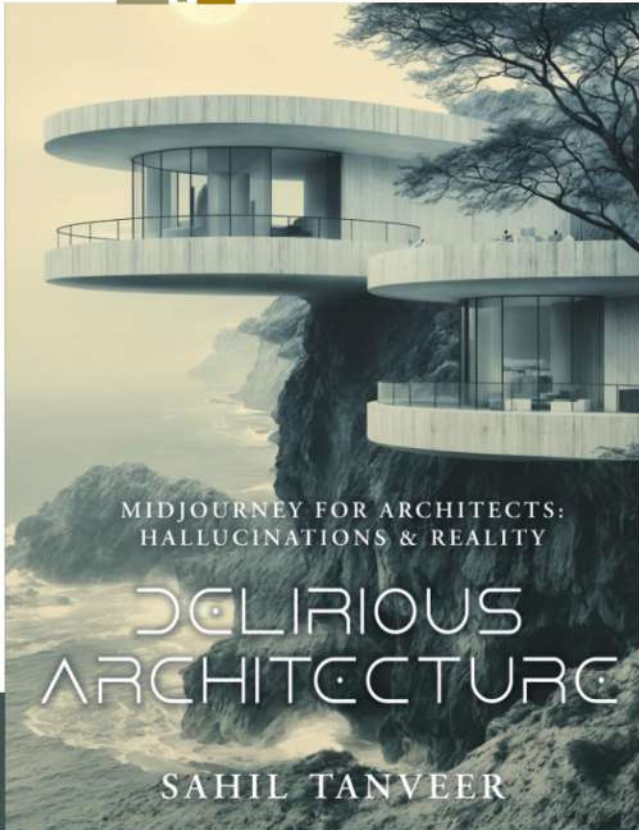
Why it's a must-watch:

The Matrix revolutionized sci-fi cinema with its groundbreaking special effects, philosophical depth, and iconic action sequences. As we grapple with the growing influence of technology on our lives, this film's exploration of reality, free will, and the nature of existence remains profoundly relevant. Its blend of mind-bending storytelling and visual innovation makes it a timeless classic that continues to inspire and provoke thought, ensuring its place as a must-watch for every film lover.

NEW

GEN





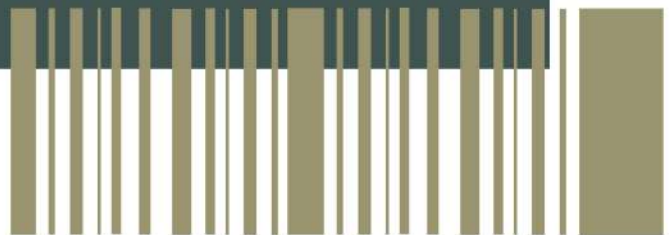
EVOLUTION

Author: Ar. Sahil Tanveer
Year of Publication: 2022

Delirious Architecture is a visionary exploration into the future of design, where architecture meets artificial intelligence, robotics, and parametric structures. Ar. Sahil Tanveer delves into the chaotic yet exciting transformation of how we build, think, and interact with our built environment. Through a blend of architectural theory, cutting-edge technology, and a deep understanding of human experience, this book challenges the traditional boundaries of architecture.

Why it's a must-read:

In an era where AI and robotics are reshaping every industry, Delirious Architecture offers an essential lens into how these advancements will redefine the way we live and create. Whether you are an architect, designer, or a tech enthusiast, this book provides invaluable insights into the next wave of architectural innovation. A must-read for those ready to embrace the unpredictable future of our cities and spaces!



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