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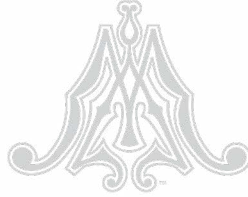
A Breakthrough in Enhancing  
Cognitive Function & Well-being  
Using Neuro Soundwaves

**Dr. Jennifer MacDiarmid and  
Dr. Himanshu Brahmbhatt**

Meet the Pioneers Behind

# EnGeneIC's Game-Changing Cancer Treatment





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# The EDV Breakthrough EnGeneIC is the Game-Changer in Cancer Treatment

by Toh Mu Qin

## Insights into the EnGeneIC Dream Vector (EDV) Technology and Its Impact on the Future of Cancer Therapy.

Cancer is a global health crisis that continues to affect millions of lives each year. According to statistics from the World Health Organisation (WHO) and the International Agency for Research on Cancer (IARC), in 2022, there were an estimated 20 million new cancer cases and 9.7 million cancer-related deaths worldwide. Despite advancements in medical science, the fight against cancer remains daunting, with approximately 1 in 5 people expected to develop cancer during their lifetime. The survival rate has improved, with about 53.5 million individuals alive five years after a cancer diagnosis. However, the prevalence of the disease stresses the urgent need for more effective and targeted treatment options.

Cancer patients are not only faced with financial stress, but also immense emotional stress. When a doctor informs the patient that he/she has cancer, it can be the most frightening day of their lives. The first few questions are always, “What are the side effects of my treatment? Will I lose my hair? Will I be sick all the time? How will it interfere with my daily life?” Next, there are questions about the cost of treatment, not only immediate costs but the ongoing cost of after-care. Cancer not only affects the patient, but involves the entire circle of people surrounding them, especially those who love them. Some patients may even suffer from depression where they shut themselves away from the whole world and live in seclusion. The economic cost of the unintended consequences for cancer patients far exceeds the financial cost.

Traditional cancer treatments, such as surgery, radiation therapy, and chemotherapy, have been the mainstays of oncology for decades. Surgery and radiation are effective for localised cancers, but they often fall short in cases where the disease has spread. Chemotherapy, while crucial for treating various cancers, is notorious for its broad toxic side effects, which damage healthy cells and cause significant discomfort for patients. In addition, the increase in toxicity in the patient’s body may cause organ and immune cell damage allowing relapse and resistance to further treatment.

Recent years have seen the rise of targeted therapies and immunotherapies. Targeted therapies are designed to interfere with specific molecules involved in cancer growth, while immunotherapies aim to harness the body’s immune system to combat the disease. Although these therapies represent significant advancements, they are not without their own set of challenges. Targeted therapies are not effective for all cancer types or patient populations, and immunotherapies can sometimes lead to severe side effects and also have limited application to certain tumour types.

### Pioneering a Breakthrough Approach to Cancer Care

EnGeneIC, a biopharmaceutical company co-founded by Dr. Jennifer MacDiarmid and Dr. Himanshu Brahmbhatt, has developed the EDV technology that promises to transform the future of cancer treatment, offering hope to millions of patients worldwide. EnGeneIC, as the name implies, is Entry of Genes into Cancer cells. The story of EnGeneIC began with a shared vision between these two accomplished scientists. Their journey, shaped by personal experiences and professional aspirations, was driven by their commitment to advancing medical science and improving patient outcomes and quality of life.



Photo: EnGeneIC





Dr. MacDiarmid's scientific journey began far from the laboratory, on a sheep farm in Sydney, Australia. Growing up, she was fascinated by the natural world. Her early exposure to science came from hands-on experiences with her father, as they examined parasites affecting their sheep under microscopes and captured the night sky through time-lapse photography. This early curiosity led to formal studies in molecular biology, culminating in her M.Sc. and Ph.D. from the University of New South Wales in Sydney. Before joining the Commonwealth Scientific and Industrial Research Organisation (CSIRO), Dr. MacDiarmid worked on allergic diseases, bridging the gap between basic science and its application in immunology.

Dr. Brahmbhatt, on the other hand, had a more tumultuous start. Raised in Mombasa, Kenya, he faced significant health challenges, including frequent bouts of malaria and high blood pressure from a young age. Despite these obstacles, he pursued higher education in India, where he completed his bachelor's and master's degrees before embarking on a Ph.D. in Australia. His research took him to Germany and Switzerland, where he focused on vaccines against bacterial

diseases. However, his personal experiences with illness and his desire for more complex challenges led him to switch focus to parasitic diseases. His career path eventually brought him to CSIRO in Sydney, where he led a team working on vaccines against parasites.

It was at CSIRO where Dr. MacDiarmid and Dr. Brahmbhatt's paths crossed. Though they worked in different laboratories, it took a tragic event to catalyse a connection between them. Dr. Brahmbhatt's technician, a highly skilled individual from Hong Kong, was diagnosed with terminal lung cancer. This personal tragedy struck a chord with both scientists, and they strongly felt that if their research efforts could not help people in desperate situations then their own lives had no purpose. Both careers took a swift turn, and the focus changed to cancer research. Starting with a clean slate, they brainstormed about all the pitfalls in cancer treatment and a search for a unified solution to address as many of the problems as possible. Their combined resolve led them to explore the potential of bacterially derived nanocell carriers for genetic materials, an idea that would eventually become the foundation of EnGeneIC.





Photo: EnGeneIC

Although faced with the intimidating prospect of leaving secure senior scientist jobs, Drs. MacDiarmid and Brahmhatt made the bold decision to resign from CSIRO. With no guaranteed funding but a powerful vision, they embarked on a challenging journey to raise seed funding for EnGeneIC. Their persistence and belief in their mission paid off as they secured initial funding of AU\$4 million, setting the stage for the company to make a significant impact on cancer treatment.

At the core of EnGeneIC's innovation is the Antibody-Nanocell-Drug Conjugate (ANDC) technology, which represents a significant leap forward in the field of cancer treatment. This technology involves the creation of non-living, bacterially derived nanocells that can be loaded with therapeutic agents and precisely targeted to cancer cells. The process begins with the use of a genetically engineered strain of *Salmonella typhimurium* bacteria, which can divide at its poles, generating uniform nanocells with a diameter of approximately 400 nanometres (nm), too small to carry a chromosome and hence cannot replicate.

These nanocells, designated as EDVs (EnGeneIC Dream Vectors), are safe and non-toxic in humans. They are characterised by a robust double-walled membrane, which provides stability for any payload. Each EDV has the capacity to carry up to 1 million drug molecules or 10,000 siRNA copies, making it a powerful vehicle for delivering therapeutic payloads.

One of the most striking features of the ANDC technology is its use of a bispecific antibody that binds to both the nanocell and the cancer cell surface. Once injected into the body, the EDV navigates through the blood stream and falls out of the leaky blood vessels that always surround the tumour. This passive targeting is a great advantage for safety since at 400 nm, the EDV cannot escape normal blood vessels where

the gaps are 100 nm or less. Once in the tumour micro-environment, the targeting antibody binds to the cancer cell surface receptor, and this triggers the cancer cell into swallowing the antibody-targeted, drug-packaged EDVs. Once inside the cancer cell, the EDVs are broken down and release their payload, leading to the destruction of the tumour cells. This approach not only maximises the precision and effectiveness of cancer treatment but may also minimise the collateral damage often associated with conventional cancer treatments. Simultaneously, because the EDV is derived from bacteria, it stimulates a potent anti-cancer immune response and recruits new "fighter" white blood cells to flood into the body from the bone marrow and invade the tumour environment to swallow dying cancer cells and display cancer components to killer T-cells. This results in a knockout punch to the tumour by killing tumour cells directly and then training immune cells to recognise residual tumour.

### The Unique Strengths of EDV Technology Explained

EDV technology offers several unique advantages compared to other cancer treatment modalities. Unlike synthetic nanoparticles, targeted drugs, immunotherapies, and antibody-drug conjugates, EDVs can target a broad range of cancers by simply changing the bispecific antibody that coats the EDV surface and hence are able to be targeted to any cancer. They can be packaged with a range of different therapeutic payloads such as anti-cancer drugs, nucleic acids or immune stimulating adjuvants resulting in the ability to stimulate the desired type of anti-cancer response. EDVs avoid entry into normal tissues due to their large size (400 nm) and enter into the cancer microenvironment via the tumour associated leaky blood vessels which avoids damage to normal tissues. The EDVs are only taken up inside the cancer cells since they carry the tumour-targeting antibody and are broken down inside the cancer cell, releasing the toxic payload intracellularly. This avoids any collateral damage even if the cancer is located in very vulnerable locations like the brain. EDV therapeutics are the first to show minimal to no toxicity in cancer patients despite many patients receiving 50 to 80 repeat doses. Now, we have a treatment that possibly eliminates the fear of horrible toxicity when one is diagnosed with cancer.

Furthermore, EDVs are able to effectively target and kill multi-drug-resistant cancers with a super-cytotoxic payload (unable to be given systemically). There is no other therapy that can overcome multiple drug resistance mechanisms that are elaborated by cancer cells. This drug resistance means the cancer keeps coming back despite different treatments. EDVs also activate a wide range of tumour-fighting immune cells, enhancing the body's natural anti-tumour defence mechanisms. Another important advantage is affordability. Many novel cancer treatments, such as immunotherapies, can be prohibitively expensive, often exceeding US\$200,000 per patient per year. EDVs are relatively inexpensive to manufacture and hence can be made affordable worldwide.



In addition, EDVs have demonstrated potential in treating end-stage cancer patients who have exhausted all other treatment options. Clinical trials have shown that EDVs can provide therapeutic benefits even in cases where other therapies have failed, highlighting their potential to offer new hope to patients with advanced metastatic and low survival cancers.

### **A Path Defined by Resilience and Discovery**

However, the development of EDV technology has been a long, arduous journey for Dr. MacDiarmid, Dr. Brahmbhatt, and their team at EnGeneIC. Over the past two decades, they have faced numerous challenges, from financial constraints to the complexities of bringing a novel technology to market.

Drs. MacDiarmid and Brahmbhatt's dedication to their work is evident in their personal sacrifices. During difficult times, such as the Lehman Brothers crisis in 2008 and the COVID-19 pandemic, they took pay cuts and even went without pay to ensure that their team could stay together and continue working. This commitment to their team and their unwavering belief in their mission have enabled them to develop resilience and overcome obstacles to progress the EDV technology into the clinic.

### **EDV's Potential Confirmed by Clinical Trials and FDA Fast-Tracking**

EDV technology has shown great promise in pre-clinical and clinical trials. The data has been published in numerous peer-reviewed, high impact scientific and clinical journals. The most significant results have come from trials focused on treating pancreatic ductal adenocarcinoma (PDAC), one of the most aggressive and deadly forms of cancer. The positive outcomes from these trials led to the United States Food and Drug Administration (FDA) granting Fast-Track Designation for EDV-based treatment of PDAC, affirming the potential of this technology to address unmet medical needs in low survival cancers.

The early successes emerging from EnGeneIC's clinical trials offer new hope for cancer patients worldwide. For instance, a woman in Los Angeles undergoing EDV treatment was able to take a month-long vacation to Paris during her therapy, an unimaginable scenario with traditional cancer treatments. This lady is now in complete remission 26 months since the start of EDV treatment. Another end-stage mesothelioma patient showed a near complete elimination of the tumour in his lungs, a result so unprecedented that the oncologist ran down the hospital corridor waving the scan result in disbelief. In a small trial in USA, an end-stage glioblastoma patient who was paralysed waist-down, made a dramatic recovery following EDV treatment and the startling news was reported as a story by CBS television in USA.

Despite these successes, EnGeneIC has also faced significant challenges in bringing its technology to market. The path

to FDA approval is long and fraught with hurdles, and the company is still navigating this complex landscape. However, the potential of EDV technology to significantly improve cancer treatment is undeniable, and EnGeneIC is committed to making this life-saving therapy accessible to patients worldwide.

### **EDV Technology for Global Application**

As EnGeneIC moves closer to commercialising its EDV technology, the company faces the challenge of scaling its operations to meet global demand. One of the key concerns is ensuring that the technology remains affordable and accessible to patients worldwide, particularly in developing countries where access to advanced cancer treatments is often limited.

EnGeneIC has made it a priority to keep the cost of EDV treatment significantly lower than other immunotherapies currently on the market. By carefully managing production and development costs, the company aims to make EDV therapy accessible to a broad range of patients.

The potential market for EDV technology is vast, given the global burden of cancer. With over 200 different types of cancer, the demand for effective and safe treatments is enormous. EDV technology, with its ability to target multiple types of cancer and its reduced toxicity, positions the company to capture a significant share of the global cancer treatment market.

EnGeneIC's technology also holds particular appeal for high-net-worth individuals (HNWIs) and ultra-high-net-worth individuals (UHNWIs), especially in Asia. The ability to offer cutting-edge cancer treatment with minimal side effects and the promise of an improved quality of life is likely to resonate with affluent patients seeking the best possible care, and those who wish to put something back into their communities. Additionally, the company's focus on expanding access to its technology in Asia, including countries like Hong Kong, Singapore, China, Malaysia, and Indonesia, showcases its commitment to making a global impact.

### **The Emergence of Theragnostic in Cancer Care**

EnGeneIC is also exploring the exciting field of theragnostics, which combines therapy and diagnostics in one seamless approach. The concept involves using the EDV technology to not only diagnose tumours but also deliver targeted therapy simultaneously. For example, by attaching a radioisotope to the EDV, clinicians can light up the tumour for imaging while delivering a potent therapeutic payload to the cancer cells. This dual functionality maximises the efficiency of cancer treatment, allowing for real-time monitoring of therapeutic effectiveness and reducing the need for multiple procedures.

EnGeneIC is also investigating the integration of boron into EDVs for cancer treatment, particularly for brain, head and

neck cancer. Boron neutron capture therapy (BNCT) is a promising approach that involves delivering boron to cancer cells and then irradiating the area with a neutron beam to trigger the release of alpha particles, which can directly kill cancer cells to prevent its scatter throughout the body and to accumulate sufficient boron in the cancer cells for BNCT to be effective. EDV technology has demonstrated the ability to load boron effectively and is now conducting pre-clinical studies on delivering it to cancer cells, potentially opening as yet untried, new avenues for EDVs.

### Strategic Collaborations and Market Potential

The potential of the EDV technology has attracted significant interest from investors and strategic partners. One of the notable collaborations is with the Singapore Institute of Advanced Medicine Holdings (SAM Holdings). This partnership is poised to significantly advance cancer treatment in Asia and offers several key benefits.

The agreement between SAM and EnGeneIC envisages exclusive distribution rights for EDV cancer therapeutics in 17 countries in Asia. Additionally, the two parties will collaborate on the development of EDV-based theragnostic, and imaging agents. This partnership represents a dual-pronged expansion of revenue streams through a profit-sharing agreement and is aligned with SAM Holdings' core vision of investing in next-generation technologies, especially in the area of cancer treatment.

The collaboration also aims to enhance Singapore's position as a leading medical tourism hub by bringing cutting-edge cancer treatments to the region. SAM Holdings will support EnGeneIC in securing funding and regulatory approvals for establishing a manufacturing plant in Singapore, conducting clinical trials, and obtaining market authorisation for EDV-based products.

The potential value of EnGeneIC is staggering. Drs. MacDiarmid and Brahmhatt have resisted offers to sell the company, recognising that its true value has yet to be realised. Their decision to hold on to their technology reflects their confidence in its potential and their commitment to ensuring that it reaches its market success. As EnGeneIC moves closer to securing regulatory approvals and scaling its operations, its valuation could skyrocket, offering significant returns to investors and stakeholders.

Comparisons to other biotech companies that have been acquired for billions of dollars emphasise the immense potential of EDV technology. For example, Pfizer's \$43 billion acquisition of Seagen, a company with a standard ADC platform, highlights the market's appetite for innovative cancer treatments. Similarly, Merck's checkpoint inhibitor, Keytruda, which has been approved for over 17 different cancers, generates \$20 billion in annual revenue despite its possible toxic side effects.



Photo: EnGeneIC

EnGeneIC, with its non-toxic, versatile platform capable of targeting multiple cancers, could easily surpass these benchmarks. The company's extensive patent portfolio, which includes over 200 granted overlapping patents and covers numerous aspects of its technology, further reinforces the valuation. EnGeneIC is the sole owner of this patent portfolio, and the patent life currently extends out to 2042, and is expected to exceed 2050 with several new patent families yet to be filed. These patents, coupled with EnGeneIC's confidential know-how, create a formidable barrier to entry for potential competitors, and position the company for long-term success.

### Exploring Future Prospects for EnGeneIC and EDV

As EnGeneIC continues to advance its EDV technology and expand its reach, the future holds exciting possibilities for further innovation and impact. The company's ongoing research and development efforts, coupled with its dedication to addressing global health challenges, position it as one of the leaders in the next generation of cancer treatment. The ability of EDV technology to deliver therapeutic agents with high precision, overcome drug resistance, stimulate an anti-tumour immune response and provide affordable treatment options, highlights its potential to become a cornerstone of future oncology care.

Looking ahead, EnGeneIC's vision for the future encompasses not only enhancing the effectiveness of EDV technology but also exploring new applications and integrating with other emerging technologies. By focusing on personalised medicine, theragnostic approaches, and global accessibility, the company aims to meet the diverse needs of cancer patients and propel advancements in oncology.

For HNWI, UHNWI and stakeholders, the opportunity to support and be part of EnGeneIC's journey represents a chance to contribute to an unprecedented major movement



in cancer care. The potential for highly significant returns, both in terms of financial value and societal impact, highlights the importance of continued investment and support for innovative technologies like EDV. The future of a cure for cancer is bright, with EDV technology leading the way toward a new era of personalised and effective treatments.

### Personal Philosophies and Professional Advice from Dr. MacDiarmid and Dr. Brahmbhatt

Dr. MacDiarmid and Dr. Brahmbhatt have achieved remarkable milestones in their careers, with the establishment of EnGeneIC and successful development of EDV technology being their most significant professional accomplishments. Dr. MacDiarmid emphasises the impact of their work on patients' lives and the positive results observed in clinical trials. Dr. Brahmbhatt highlights their resilience through challenging periods, including financial difficulties and global crises, demonstrating their commitment and perseverance. Both strongly feel that to see a genuine smile of relief on the faces of cancer patients is itself worth a fortune and if that is achieved, a material fortune should follow and for investors, the dual win would make EnGeneIC their most satisfying investment.

For young scientists and entrepreneurs aspiring to make a difference in the medical field, Dr. MacDiarmid and Dr. Brahmbhatt offer valuable advice. Dr. MacDiarmid advocates for the importance of forging strong partnerships and remaining resilient, encouraging others to seek collaborators who share their vision and to maintain adaptable in the face of challenges. Meanwhile, Dr. Brahmbhatt stresses the need for thorough preparation and flexibility, advising aspiring entrepreneurs to embrace adversity as an opportunity for growth and innovation.

Dr. Brahmbhatt shared a pivotal experience from EnGeneIC that exemplifies this perspective. "Adversity is the mother of invention. People must learn to be resilient and persevere through difficulties," he remarked. During the COVID-19 pandemic, while EnGeneIC was primarily focused on cancer treatment, the team had a sudden realisation about the potential for infectious disease vaccines. This insight



Photo: EnGeneIC

led them to develop a novel vaccine within a month, which dramatically illustrated EnGeneIC's ability to pivot into new areas and increase the company's value.

The EDV-COVID vaccine which emerged, offers several distinctive advantages over existing vaccines. It provides effective protection against all mutant strains of the virus and has the capability to carry multiple antigens from different viruses, reducing the need for multiple vaccines. The EDV vaccine also offers long-lasting immune protection, thereby minimising the need for frequent booster shots. Unlike conventional vaccines that require storage and transportation at extremely low temperatures, the EDV vaccine can be stored and transported at room temperature. Furthermore, it boasts a shelf life of over four years, significantly longer than the six months to one year typical for current vaccines. Additionally, the EDV vaccine provides protection not only systemically but also through intranasal administration, offering enhanced defence against respiratory viruses.

EnGeneIC's Phase I and Phase II(A) clinical trials for the EDV-COVID vaccine, conducted with 80 healthy volunteers, confirmed that the vaccine's efficacy matched the results from pre-clinical studies. This vaccine provides proof-of-concept for a variety of vaccines which do not address mutant strains nor emerging pandemics. This experience illustrates how facing adversity can lead to thinking outside the box which can result in remarkable innovations and reinforces the company's confidence in the potential of their technology.

Their personal philosophy at EnGeneIC centres on the belief that everyone is equal and essential to the team's success. They believe in the importance of teamwork and patience, recognising that long-term achievements are the result of collective effort and dedication.

### Closing Reflections

EDV technology represents a key advancement in the fight against cancer, offering a novel and highly effective approach to targeted therapy. With its precision targeting, reduced toxicity, waking up of the anti-cancer immune system and potential for broad applications, EDV technology has the power to drastically improve cancer treatment and enhance the quality of lives of millions of patients worldwide.

As EnGeneIC moves forward with its mission, the potential of EDV technology remains promising, offering hope for a future where cancer can be treated with greater precision, effectiveness, and compassion. For those looking to support the next frontier of cancer treatment, EnGeneIC represents a compelling opportunity to be part of a meaningful journey that could make a lasting impact on the world. 🌱

*Disclaimer:* The health information in this article represents the EnGeneIC scientists and author's personal opinions. It does not constitute medical or professional services. Always consult your doctor or qualified healthcare provider if you have any specific healthcare needs.

# EDV技术的突破性发展 – EnGeneIC: 癌症治疗领域之游戏 规则改变者

作者 Toh Mu Qin

## 深入了解 EnGeneIC Dream Vector (EDV)技术 及其对未来癌症治疗的影响

癌症是全球性的健康危机，每年影响数百万人的生命。根据世界卫生组织 (WHO) 和国际癌症研究机构 (IARC) 的统计数据，2022 年全球预计新增癌症病例 2000 万例，癌症相关死亡人数 970 万例。尽管目前医学科学取得了显著进步，但抗击癌症的斗争仍然艰巨，预计约五分之一的人口终其一生将会患上癌症。虽然目前癌症的存活率有所提高，约有 5350 万人在被诊断出癌症后五年内仍能存活。但是癌症的流行更加凸显了对更有效、更有针对性的治疗方案的迫切需求。

癌症患者不仅面临经济压力，还面临巨大的情感压力。当医生告知患者他/她们患有癌症时，这可能是他们一生中最可怕的一天。第一个问题总是治疗的副作用是什么？——我会掉头发吗？我会一直生病吗？它会如何影响我的日常生活？接下来是治疗费用的问题，不仅是即时治疗的费用，还有后续护理的持续费用。癌症不仅影响患者，还涉及他们周围的所有人，尤其是那些深爱他们的人们。一些患者甚至可能患上抑郁症，把自己与整个世界隔离开来，过着隐居的生活。癌症患者意外后果的经济成本远远超过癌症治疗本身的财务成本。

几十年来，传统的癌症治疗方法，如手术、放疗和化疗，一直是肿瘤治疗的支柱。手术和放疗对局部癌症有效，但在疾病已经扩散的情况下，它们往往达不到治疗效果。化疗虽然对治疗各种癌症至关重要，但因其广泛的全身副作用而臭名昭著，它会损害健康细胞并给患者带来极大的不适。此外，药物副作用对患者机体的损害可能导致器官和免疫细胞损伤，从而导致癌症复发和对进一步治疗的拮抗。

近年来，靶向疗法和免疫疗法逐渐兴起。靶向疗法旨在干扰参与癌症生长的特定分子，而免疫法则旨在利用人体的免疫系统来对抗疾病。尽管这些疗法代表了重大进展，但它们也存在一系列难题。靶向疗法并非对所有癌症类型或患者群体都有效，而免疫疗法有时会导致严重的副作用，并且对某些肿瘤类型的应用也有所限制。

### 开创突破性的癌症治疗

EnGeneIC 是一家由 Jennifer MacDiarmid 博士和 Himanshu Brahmhatt 博士共同创立的生物制药公司，该公司开发的 EDV 技术有望改变癌症治疗的未来，为全球数百万癌症患者带来希望。EnGeneIC, Entry of Genes into Cancer cells, 顾名思义，就是诱导基因进入癌细胞。EnGeneIC 的创立始于这两位杰出科学家的共同愿望。他们的人生旅程由他们的个人经历和职业抱负所塑造，由他们对推动医学科学发展和改善患者治疗效果及生活质量的承诺所驱动。



Photo: EnGeneIC





MacDiarmid博士的科学之旅始于远离实验室，澳大利亚悉尼的一个牧羊场。在成长过程中，MacDiarmid博士对自然界非常着迷。她早期接触科学的经历来自于与父亲的亲身体会，他们在显微镜下检查感染羊群的寄生虫，并通过延时摄影捕捉夜空。这种早期的好奇心促使她正式研究分子生物学，并最终在悉尼新南威尔士大学获得硕士和博士学位。在加入澳大利亚联邦科学与工业研究院（CSIRO）之前，MacDiarmid博士致力于过敏性疾病疫苗的研究，弥补了免疫学中基础科学与应用科学之间的差距。

而Brahmbhatt博士的起步则更加坎坷。他在肯尼亚的蒙巴萨长大，从小就面临着严重的健康问题，包括经常患疟疾和高血压。尽管面临这些困难，Brahmbhatt博士还是前往印度继续深造，在那里完成了学士和硕士学位，然后在澳大利亚攻读博士学位。之后他前往德国和瑞士进行研究，在那里专注于细菌性疾病疫苗的研究。然而，他个人的患病经历和他对更复杂挑战的渴望使他

将研究重点转向寄生虫疾病。他的科学研究最终将他带到了澳大利亚联邦科学与工业研究院（CSIRO），在那里他加入了一个研究寄生虫疫苗的团队。

正是在澳大利亚联邦科学与工业研究院，MacDiarmid博士和Brahmbhatt博士相遇了。尽管他们在不同的实验室工作，但一场悲剧事件促使他们走到了一起。Brahmbhatt博士团队的一名来自香港的高极技术员，被诊断出患有晚期肺癌。这场个人悲剧让两位科学家都感同身受，他们强烈地感觉到，如果他们的研究工作无法帮助处于绝境的人们，那么他们自己的生活也就没有特别的意义。两人的职业生涯迅速转向，重点转向癌症研究。他们从零开始，集思广益，探讨了癌症治疗的所有难题，并寻找统一的解决方案来解决尽可能多的问题。他们共同的决心促使他们探索运载遗传物质的细菌载体的特殊潜力，这个想法最终成为EnGeneC的研究基础。



Photo: EnGeneIC

尽管如果离开稳定的高级科学家职位，他们将面临着无法确认的职业前景，但 MacDiarmid 博士和 Brahmbhatt 博士还是做出了大胆决定，从 CSIRO 辞职。在没有资金保障的情况下，他们怀揣着强大的愿望，踏上了为 EnGeneIC 筹集种子资金的艰难旅程。他们的坚持和对使命的信念得到了回报，他们获得了 四百万澳币的初始资金，为公司在癌症治疗方面发挥重大作用奠定了基础。

EnGeneIC 创新的核心是抗体-纳米细胞-药物偶联物 (ANDC) 技术，该技术代表了癌症治疗领域的重大飞跃。这项技术涉及创造无活性，细菌衍生的纳米细胞。这些纳米细胞可以加载肿瘤治疗药物并精确靶向癌细胞。该技术始于使用一种经过基因工程改造的鼠伤寒沙门氏菌菌株，该菌株可以在其两极分裂，产生直径约为 400 纳米的均匀纳米细胞，这种纳米细胞太小而无法携带染色体，因此无法复制。

这些纳米细胞被称为 EDV (EnGeneIC Dream Vectors)，对人体安全无毒。它们的特点是坚固的双层膜，可为任何潜在的有效载荷提供稳定性。每个 EDV 可携带多达 100 万个药物分子或 10,000 个 siRNA 拷贝，使其成为运送治疗载体的强大载体。

ANDC 技术最引人注目的特征之一是它使用了一种双特异性抗体，这种抗体可以同时与纳米细胞和癌细胞表面结合。一旦注射到体内，EDV 就会通过血流，从肿瘤

周围的渗漏血管中渗透至肿瘤微环境。这种被动靶向在用药安全方面具有很大的优势，因为正常血管间隙通常是 100nm 或更小，400nm 的 EDV 无法渗透出正常血管。EDV 一旦进入肿瘤微环境，靶向抗体就会与癌细胞表面受体结合，从而触发癌细胞吞噬抗体靶向的 EDV。一旦进入癌细胞，EDV 就会分解并释放其有效载荷，从而破坏肿瘤细胞。这种方法不仅最大限度地提高了癌症治疗的精确度和有效性，而且还最大限度地减少了传统癌症治疗中经常出现的副作用损害。

同时，由于 EDV 源自细菌，因此它能够刺激强大的抗癌免疫反应，并招募新的“抗癌斗士”抗癌白细胞，抗癌白细胞从骨髓进入体内循环，侵入肿瘤环境，吞噬垂死的癌细胞，并向杀伤性 T 细胞展示癌症成分。这种抗癌免疫反应不仅可以直接杀死肿瘤细胞，并且能够训练免疫细胞识别残留肿瘤细胞，从而对肿瘤造成致命一击。

### EDV 技术的独特优势

与其他癌症治疗方式相比，EDV 技术具有多项独特优势。与合成纳米颗粒、靶向药物、免疫疗法和抗体-药物偶联物不同，EDV 只需改变覆盖 EDV 表面的双特异性抗体，即可靶向多种癌症，因此能够靶向治疗任何癌症。它们可以与各种不同的治疗载荷一起包装，例如抗癌药物、核酸或免疫刺激佐剂，从而能够刺激所需类型的抗癌反应。EDV 由于尺寸较大 (400nm)，因此不会进入正常组织，仅通过肿瘤周围的渗漏血管进入肿瘤微环境，从而避免对正常组织造成损害。EDV 仅进入癌细胞内部，因为它们携带靶向肿瘤细胞的抗体，并在癌细胞内部分解，在细胞内释放细胞毒性的治疗载荷。即使肿瘤位于非常敏感的位置 (如大脑内部)，也可以避免任何附带损害。尽管许多患者接受了 50 至 80 次重复剂量治疗，但 EDV 疗法是第一个对癌症患者表现出极小毒性甚至无毒性的疗法。我们终于有了一种治疗方法，可以消除人们在被诊断出患有癌症时对恐怖副作用毒性的恐惧。

此外，EDV 可以运载具有超细胞毒性的抗癌药物，有效靶向癌细胞，克服多重耐药性，并杀死癌细胞。此类具有超细胞毒性的抗癌药物因其毒性太大，一般无法全身给药。至今为止，没有任何其他疗法可以克服癌细胞产生的多种耐药机制，这就是为什么癌症不断复发，即



使是最好的疗法最终也会失败。同时EDV还能够激活多种抗肿瘤免疫细胞，增强人体抗癌的天然防御机制。

EDV另一个重要优势是价格实惠。许多新型癌症治疗方法(例如免疫疗法)可能非常昂贵，通常每位患者每年的费用超过二十万美金。EDV的制造成本相对较低，因此可以在全球范围内负担得起治疗费用。

此外，EDV在治疗已用尽所有其他治疗方案的终末期癌症患者方面显示出其特有潜力。临床试验表明，即使在其他疗法失败的情况下，EDV也可以提供治疗益处，这凸显了它们为晚期转移性和低生存率癌症患者带来新希望的潜力。

### 由韧性和探索定义的研究道路

然而，对于 MacDiarmid 博士、Brahmbhatt 博士及其 EnGeneIC 团队来说，EDV 技术的开发是一段漫长而艰辛的旅程。在过去的二十年里，他们面临着无数挑战，从资金短缺到将新技术推向市场的复杂性。

MacDiarmid 博士和 Brahmbhatt 博士对工作的奉献精神体现在他们的个人牺牲中。在困难时期，例如 2008 年的雷曼兄弟危机和 COVID-19 大流行期间，他们减薪甚至停薪，以确保研究团队能够继续工作。这种对团队的承诺和对使命的坚定信念使他们能够培养韧性并克服障碍，将 EDV 技术推进到临床试验阶段。

### 战略合作和市场潜力

EDV技术的潜力吸引了许多投资者和战略合作伙伴的极大兴趣。其中一项值得注意的合作是与新加坡高级医学研究所控股公司(SAM Holdings)的合作。这一合作伙伴关系有望显著推进亚洲的癌症治疗，并提供多项显著优势。

SAM 和 EnGeneIC 之间的协议授予了 EDV 癌症治疗药物在亚洲 17 个国家/地区的独家分销权。此外，双方将合作开发基于 EDV 的诊疗药物和成像剂。这一合作伙伴关系既可通过利润分享协议，双管齐下，扩大收入来源，也与 SAM Holdings 投资新一代技术(尤其是癌症治疗)的核心愿望相一致。

此次合作还旨在通过将尖端癌症治疗方法引入该地区来提升新加坡作为领先医疗旅游中心的地位。SAM Holdings 将支持 EnGeneIC 获得资金和监管批准，并在新加坡建立制造工厂、进行临床试验以及获得EDV产品的市场授权。

EnGeneIC 的潜在价值是惊人的。MacDiarmid 博士和 Brahmbhatt 博士拒绝了出售该公司的提议，因为他们认识到该公司真正的价值尚未实现。他们决定继续保留这项技术，这反映了他们对其技术潜力的信心以及他们对确保市场上成功的承诺。随着 EnGeneIC越来越接近获得监管批准和扩大运营规模，其估值可能会飙升，为投资者和利益相关者带来可观的回报。

与其他被收购数十亿美元的生物技术公司相比，EDV 技术的巨大潜力更加凸显。例如，辉瑞斥资 430 亿美元收购拥有标准 ADC 平台的 Seagen 公司，凸显了市场对创新癌症治疗的需求。同样，默克的免疫疗法 Keytruda 已被批准用于治疗超过16种不同的癌症，尽管具有毒副作用，但每年仍能产生 200 亿美元的收入。

EnGeneIC凭借其能够靶向多种癌症的无毒、多功能技术平台，可以轻松超越这些基准。该公司广泛的专利组合，包括 200多项已授权的重叠专利，涵盖其技术的多个方面，进一步加强了其估值。EnGeneIC 是该专利组合的唯一所有者，专利期限目前延长至 2042 年，预计将超过 2050 年，还有几个新的专利系列申请等待提交。这些专利，再加上 EnGeneIC 的机密技术，为潜在竞争对手设置了强大的复制壁垒，并为公司的长期成功奠定了基础。

### EDV潜力的证实：临床试验结果和 FDA 授予快速通道资格

EDV技术在临床前期和临床试验中显示出巨大的发展前景。这些数据已发表在许多同行评审，高影响力的科学和临床期刊上。最重要的结果来自于治疗胰腺导管腺癌 (PDAC) 的临床试验。PDAC 是最具侵袭性和致命性的癌症之一。这些试验的积极结果促使了FDA 授予了 PDAC EDV疗法快速通道指定资格，肯定了该技术在解决低生存率癌症尚未满足的医疗需求方面的潜力。

EnGeneIC临床试验取得的早期成功为全球癌症患者带来了新的希望。例如，洛杉矶一名接受EDV治疗的女性能够在治疗期间前往巴黎度假一个月，这在传统癌症治疗中是不可想象的。这位女士在 EDV 治疗26个月后，病情处于完全缓解状态。另一名终末期皮瘤患者肺部的肿瘤几乎完全消除，这一结果史无前例，以至于肿瘤科医生难以置信地挥舞着扫描结果跑下医院走廊。在美国的一项小型临床试验中，一名腰部以下瘫痪的终末期胶质母细胞瘤患者在接受EDV 治疗后奇迹般地康复了。美国哥伦比亚广播公司(CBS)电视台报道了这一令人震惊的消息。

尽管取得了这些成功，但 EnGeneIC 在将其技术推向市场的过程中也面临着重大挑战。获得 FDA 批准的道路漫长而充满障碍，该公司仍在这一复杂的环境中继续努力。然而，EDV 技术显著改善癌症治疗的潜力是不可否认的，EnGeneIC 致力于让全世界的患者都能获得这种挽救生命的疗法。

### EDV 技术的全球应用

随着 EnGeneIC 越来越接近将其 EDV 技术商业化，该公司面临着扩大运营以满足全球需求的挑战。其中一个关键问题是确保全球患者都能够负担得起此医疗费用并获得该癌症治疗技术，特别是在那些往往无法获得晚期癌症治疗的发展中国家。

EnGeneIC 的首要任务是使 EDV的 治疗成本显著低于目前市场上的其他免疫疗法。通过精心管理生产和开发成本，该公司旨在让广大患者能够接受 EDV 治疗。

鉴于全球癌症负担沉重，EDV 技术的潜在市场十分巨大。由于癌症有 200 多种，对有效且安全的治疗方法的需求是巨大。EDV 技术能够针对多种癌症，且毒性较低，因此该公司有望在全球癌症治疗市场中占据很大份额。

EnGeneIC 的技术对高净值人士 (HNWI) 和超高净值人士 (UHNWI) 也特别有吸引力，尤其是在亚洲。能够提供副作用最小的尖端癌症治疗，以及改善生活质量的承诺，可能会引起寻求最佳治疗的富裕患者和希望回馈社区的人们的共鸣。此外，该公司专注于在亚洲，包括香港、新加坡、马来西亚和印度尼西亚等国家/地区，扩



Photo: EnGeneIC

大其技术的使用范围， 这表明了EnGeneIC致力于产生全球影响的承诺和信心。

### 癌症领域的诊疗兼并方法

EnGeneIC 也在探索令人兴奋的诊断治疗学领域。该领域将诊断和治疗无缝地结合在一起。这个概念涉及使用 EDV 技术不仅可以诊断肿瘤，而且还可以同时提供靶向治疗。例如，通过将放射性同位素连接到 EDV，临床医生可以显示肿瘤进行成像，同时向癌细胞提供有效的治疗载荷。这种双重功能最大限度地提高了癌症治疗的效率，允许实时监测治疗效果并减少对多个程序的需求。

EnGeneIC 同时也在研究将硼整合到 EDV 中用于癌症治疗，特别是脑瘤和头颈部肿瘤。硼中子俘获疗法 (BNCT) 是一种很有前途的治疗方法，它涉及将硼输送到癌细胞，然后用中子束照射该区域以触发  $\alpha$  粒子的释放，从而直接杀死癌细胞。BNCT 技术的最终挑战是找到一种有效的载体将硼输送到癌细胞中，防止其扩散至全身，并在癌细胞中积累足够的硼，使 BNCT 技术更加有效。EDV 技术已经证明了其有效加载硼的能力，目前正在进行将其输送到癌细胞的临床前期研究，这可能会为 EDV技术开辟尚未尝试的新途径。

### 探索 EnGeneIC 和 EDV 的未来前景

随着 EnGeneIC 不断改进EDV 技术并扩大其覆盖范围，未来将拥有令人兴奋的进一步创新和提高影响力的可能性。该公司持续的研发工作，加上致力于应对全球健康



挑战的决心，使其成为下一代癌症治疗领域的领导者之一。EDV技术能够高精度提供治疗剂、克服耐药性、刺激抗肿瘤免疫反应并提供负担得起的治疗选择，这凸显了其成为未来肿瘤治疗基石的潜力。

展望未来，EnGeneIC的未来愿景不仅包括提高EDV技术的有效性，还包括探索新应用并与其他新兴技术联合集成。通过专注于个性化医疗、肿瘤诊疗兼并方法及全球技术可及性，该公司旨在满足癌症患者的多样化需求并推动肿瘤学的进步。

对于高净值人士、超高净值人士和利益相关者来说，有机会支持并参与EnGeneIC的旅程，代表着他们有机会为癌症治疗的重大变革做出贡献。无论是在财务价值还是社会影响方面来看，都有可能获得可观的回报，这凸显了持续投资和支持EDV等创新技术的重要性。癌症治愈的未来是光明的，EDV技术将引领着癌症治疗个性化及有效治疗的新时代。

### 来自 MacDiarmid 博士和 Brahmhatt 博士的核心理念和专业建议

MacDiarmid 博士和 Brahmhatt 博士在他们的职业生涯中取得了非凡的里程碑，EnGeneIC 的成立和 EDV 技术的成功开发是他们最重要的专业成就。MacDiarmid 博士强调了他们的工作对患者生活的影响以及在临床试验中观察到的积极结果。Brahmhatt 博士强调了他们在充满挑战的时期（包括财务困难和全球危机）的韧性，展示了他们的承诺和毅力。

对于有志于在医学领域有所作为的年轻科学家和企业家，MacDiarmid 博士和 Brahmhatt 博士提供了宝贵的建议。MacDiarmid 博士倡导建立牢固的合作伙伴关系和保持弹性的重要性，鼓励人们寻找与他们有共同愿景的合作者，并在面对挑战时保持适应能力。同时，Brahmhatt 博士强调充分准备和灵活性的必要性，建议有抱负的企业家将逆境视为成长和创新的契机。

Brahmhatt 博士也分享了 EnGeneIC 的重要经验，“逆境是发明之母。人们必须学会坚韧不拔，在困难中坚持不懈”。EnGeneIC 的发展体现了这一观点。在 COVID-19 大流行期间，虽然 EnGeneIC 主要专注于癌症治疗，但该团队意识到传染病疫苗的重要性。这一洞察力促使他

们在一个月内开发出一种新型疫苗，这极大地证明了 EnGeneIC 能够迅速进入新领域并增加公司价值。

EDV-COVID 疫苗与现有疫苗相比具有几个独特的优势。它针对病毒的所有突变株提供有效保护，并能够携带来自不同病毒的多种抗原，从而减少对多种疫苗的需求。EDV 疫苗还提供持久的免疫保护，从而最大限度地减少了频繁加强注射的需要。与需要在极低温度下储存和运输的传统疫苗不同，EDV 疫苗可以在室温下储存和运输。此外，EDV-COVID 疫苗的保质期超过四年，较之于当前疫苗典型的六个月到一年的保质期。其明显更有优势。此外，EDV 疫苗不仅提供全身保护，还可通过鼻内给药提供局部保护，增强对呼吸道病毒的防御能力。

EnGeneIC 对 80 名健康志愿者进行的 EDV-COVID 疫苗 I 期和 IIa 期临床试验证实，该疫苗的功效与临床前期研究结果相匹配。这种疫苗为各种不针对突变菌株或新出现的流行病的通用疫苗提供了构想论证。这一经验表明，面对逆境可以有助于跳出思维定式，从而带来非凡的创新，并增强了公司对其技术潜力的信心。

EnGeneIC 对待员工的理念是相信每个人都是平等的，并且对团队的成功至关重要。他们强调团队合作和耐心的重要性，认识到公司的成就是集体长期努力和奉献的结果。

### 结束语

EDV 技术代表了抗癌斗争中的一项重要进步，为靶向治疗提供了一种新颖且高效的方法。EDV 技术具有精准靶向、降低毒性、唤醒抗癌免疫系统和广泛应用的潜力，能够大幅改善癌症治疗并提高全球数百万患者的生活质量。

随着 EnGeneIC 继续推进其使命，EDV 技术的潜力仍然充满希望，为未来能够以更高的精度、有效性和同情心治疗癌症，带来了希望。对于那些希望支持未来癌症治疗的前沿领域的人来说，EnGeneIC 代表了一个极具吸引力的机会，并可能对世界产生有意义的持久影响。

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Translated by: EnGeneIC



Photo: Alexander Calder

# Sculptures in Motion

by Dionne Bel

The BMW Art Car Collection, a unique confluence of automotive engineering and fine art producing some of the fastest moving sculptures the world has ever seen, began as an inspired experiment and has grown into a celebrated tradition that continues to evolve a half-century later.

It all started with one man: Hervé Poulain. A French motor racing driver, auctioneer and art enthusiast, he visualised a project whereby a race car, a symbol of modern engineering, would be used as a canvas for contemporary art. He took his crazy idea to Jochen Neerpasch, director of the BMW motorsport division at the time, who gave him the green light. Poulain's vision took shape when he convinced American artist Alexander Calder, who revolutionised sculpture with his kinetic "mobiles", to paint a BMW 3.0 CSL. Calder's vibrant hues and bold, dynamic forms wrapped around the sleek lines of the car, creating a striking fusion of art and automobile. The world's first BMW Art Car was born.

Poulain explains his choice of Calder: "Because he invented the sculpture in motion. Besides, this was supposed to be a gift to the spectators of the 24 Hours of Le Mans [a legendary endurance race in northwestern France], who mainly tend to be not necessarily familiar with contemporary art. And this American artist's oeuvre is instantly comprehensible, with its surfaces of pure primary colours – blue, red, yellow – that

seem like something out of a children's painting book. His work has an immediate effect on us, with no need for any particular artistic background knowledge." The car debuted in 1975 at the 24 Hours of Le Mans with Poulain and two other drivers behind the wheel, not only captivating the motorsport, art and design communities, but also setting a precedent for future collaborations. Today, other car brands have followed suit, but back then it was a truly game-changing feat.

"I saved my Art Car concept for the world's greatest long-distance race," Poulain recalls. "For me, the 24 Hours of Le Mans is comparable to the Olympics. And because I was aiming for the greatest possible effect, I didn't want to enter as a private individual, but as a team driver with the infrastructure of a big company. The idea had a unique communicative value because, regardless of the outcome and the uncertainties of the race, it was relevant to all media – the sports reporters, the feuilleton and the general press at large. The performance was the cherry on top of the sundae."





Photo: Tereza Mundilová © BMW AG

Following Calder's pioneering work, a succession of distinguished artists have contributed to the collection, each bringing their unique vision to a BMW car. In 1976, Frank Stella applied his black-and-white grid based on oversized graph paper and geometric patterns to another BMW 3.0 CSL. The next year, Roy Lichtenstein's comic strip-inspired design, composed of his signature Ben Day dots of the road, rising and setting sun and passing scenery through which the car is being driven, adorned a BMW 320i, capturing the movement and energy of racing. Perhaps the most iconic of the early Art Cars is the BMW M1 by Andy Warhol, who was the first to paint the bodywork himself using brushes and even his own fingers. "I attempted to show speed as a visual image," he said. "When an automobile is really travelling fast, all the lines and colours are transformed into a blur."

As the years passed, the BMW Art Car Collection continued to evolve, reflecting changes in the art world and advancements in automotive technology. The 1980s and 1990s saw contributions from artists like Robert Rauschenberg, who incorporated photographic transfers of classical artworks into his design, and David Hockney, who erased the outer surfaces of a BMW 850 CSi and allowed the inside of the car to be made visible. As the project took on a more global dimension, artists from diverse cultural backgrounds were invited to contribute, bringing fresh perspectives and styles. For the first BMW Art Car to be designed by a woman, South Africa's Esther Mahlangu metamorphosed a BMW 525i through tribal patterns traditionally used by the Ndebele people for decorating their homes, mixing cultural heritage with contemporary design. In 2010, Jeff Koons added hundreds of dynamic lines to a BMW M3 GT2, creating a colourful explosion that echoed the car's high-speed performance.

"The BMW Art Car project was not conceived at the drawing board with PR and marketing colleagues elaborating on the best way to introduce the BMW brand into the arts," states Dr. Thomas Girst, head of BMW Group Cultural Engagement. "We have been active in the arts with hundreds of engagements around the world for more than 50 years now, and most of what we do in culture doesn't directly involve our cars. Artists working for us don't need to endorse our brand or become a BMW ambassador. I always tell them

to keep their criticality intact – and we never interfere in the creative process. Having said that, we are very much aware of the BMW Art Cars receiving a lot of attention and creating a positive image, visibility and reputation for our company. Our cultural engagements and long-term partnerships are what set us apart from the competition and other luxury brands. Our passion for arts and culture is not proclaimed, but heartfelt!"

The BMW Art Car programme is not static; it continues to grow and adapt. Recent additions reflect current dialogues in contemporary art and design. For example, the 2017 contribution by Chinese artist Cao Fei employed augmented reality to create a futuristic vision whereby a storm of colours swirled above a carbon black BMW M6 GT3 race car. Blending digital and physical realms in a commentary on technology's role in modern life and mobility, the result was a BMW Art Car for the 21<sup>st</sup> century. The most recent iteration was designed by Ethiopian-American artist, Julie Mehretu, who introduced her unique process of additive and subtractive mark-making to a BMW M Hybrid V8, which returned to race at the 24 Hours of Le Mans after a 14-year hiatus. She says she imagined her painting *Everywhen* "inhaled and digested by the car, which then transforms the car. When I was in the studio with a one-fifth scale model of the car in front of the painting, I kept thinking about how it could drip into the car somehow. Then it became interesting to think of the painting as a portal that the vehicle would move through."

Today, the 20 automobiles in the BMW Art Car Collection stand as a testament to the enduring relationship between art and technology. They are exhibited in museums and galleries worldwide, allowing a broad audience to appreciate the innovative fusion of these fields. The ongoing project is a reminder of the endless possibilities when creative minds intersect with cutting-edge engineering, bridging the gap between two seemingly disparate worlds to gather together some of the most illustrious artists of each era to transform BMW vehicles into mobile masterpieces. 🏁



### About The Writer

Dionne Bel is a freelance journalist and editorial consultant who has lived on three different continents. Dionne loves to meet with inspirational individuals in pursuit of excellence to tell their stories: emerging and established artists, designers and craftsmen, engaging entrepreneurs and philanthropists, and the movers and shakers of the world today. She contributes regularly to regional and international titles such as *Artsy*, *Design Anthology*, *Forbes*, *Robb Report*, *Shawati* and *Tatler*, shining a spotlight in particular on art, architecture, design, horology and jewellery.

# Lotus Eletre

## A Leap into the Electric Future

by Toh Mu Qin



Photos: Lotus Cars Singapore

**L**otus Eletre marks Lotus' bold entrance into the all-electric hyper-SUV market. This state-of-the-art vehicle combines innovative engineering, exceptional performance, and luxurious design, all while maintaining Lotus' heritage of technical excellence and lightweight construction.

### Lightweight Composite Structure and Advanced Joining Technologies

Lotus Eletre features a lightweight composite rear floor, demonstrating Lotus' commitment to advanced materials and engineering. This vehicle employs 16 different advanced joining technologies, including structural adhesives, self-piercing rivets, flow-drilled screws, spot welding, and laser welding. These methods contribute to a light, stiff body structure that enhances dynamic capability, comfort, and refinement, whether on road, track, or off-road. Lotus Eletre is also engineered to meet or exceed the world's most stringent safety regulations while maintaining top performance.

### Dual-Motor All-Electric Powertrain – Power, Performance, and Efficiency

Lotus Eletre's dual-motor all-electric powertrain delivers the searing performance expected of a hyper-SUV, coupled

with energy efficiency for long-range and everyday usability. Beneath the vehicle floor lies an 800-volt, 112 kWh Lithium-ion battery pack. This architecture reduces the operating current by half compared to conventional 400-volt systems, resulting in less weight, enhanced power efficiency, and faster charging.

The innovative configuration of the battery pack, with prismatic cells arranged directly within the structural casing, enhances energy density and reduces weight. This results in a WLTP Combined range of up to 600 km (373 miles) for the Eletre S and 490 km (304 miles) for the Eletre R. The thermal management system and battery control module ensure optimal operating conditions, contributing to the vehicle's impressive range and durability.

### Advanced Electric Drive Units and Regenerative Braking

Integrating compact electric motors into the front and rear axles, Lotus Eletre becomes the first all-wheel-drive Lotus road car. The permanent magnet, synchronous motors, housed together with the transmissions and inverters, deliver exceptional packaging efficiency. The Eletre S features a



single-speed transmission on the front and rear axles, while the Eletre R includes a two-speed rear axle for superior launch performance and high-speed efficiency.

With 603 hp and 710 Nm of torque, the Eletre S accelerates from 0-100 km/h (0-62 mph) in 4.5 seconds, achieving a top speed of 258 km/h (160 mph). The Eletre R, with 905 hp and 985 Nm of torque, sprints from 0-100 km/h in just 2.95 seconds, reaching a top speed of 265 km/h (165 mph). Both models feature advanced regenerative braking, enhancing real-world range by converting kinetic energy back into electrical energy during deceleration.

### **Fast, Convenient Charging**

Lotus Eletre's charging capabilities match its performance and range. A 22 kW on-board AC charger allows full battery replenishment from 0-100% in less than six hours with a 22 kW wallbox. The Lotus smartphone app provides full control over charging and pre-



conditioning, enhancing efficiency and occupant comfort. Utilising public charging stations, Lotus Eletre supports rapid 350 kW DC charging, recharging from 10-80% in just 20 minutes and adding over 120 km (74 miles) of range in five minutes.

### **Active Aerodynamics and Innovative Design**

Lotus Eletre's cab-forward design evolves Lotus' iconic sports car aesthetics into a hyper-SUV form. The 'carved by air' design ethos integrates active aerodynamic technologies, including an active front grille with petals that open and close to optimise airflow.

The interior of Lotus Eletre is luxurious and spacious, featuring a digital cockpit with cutting-edge technology. Lotus Hyper OS, powered by dual Qualcomm 8155 Snapdragon chips, provides a seamless interactive experience with 3D animations and 5G connectivity. A 15.1-inch HD OLED touchscreen, wireless device charger, and multiple HD displays for passengers ensure an immersive and connected environment.

### **Advanced Driver Assistance Systems – Safety and Future-Proofing**

Lotus Eletre comes equipped with a comprehensive suite of advanced driver assistance systems (ADAS). A total of 34 sensors, including LIDAR, radar, cameras, and ultrasonic sensors, provide a 360° view of the vehicle's surroundings. Two NVIDIA Orin-X chips offer 500 trillion operations per second, enabling features like Highway Assist and Driver Monitoring System (DMS). The Life Detection and Care system ensures the safety of children or pets left inside the vehicle, making Lotus Eletre one of the safest SUVs on the road.

### **Exterior Design – Daring and Dramatic**

Lotus Eletre's exterior design embodies 75 years of Lotus sports car DNA. With a cab-forward stance, long wheelbase, and short overhangs, it creates the impression of a high-riding sports car. The aerodynamic principle of porosity, seen in the Evija hypercar, is integral to the design, reducing drag and enhancing performance. The aggressive rake of the windscreen, muscular haunches, and floating D-pillar with an 'air blade' aid in aerodynamic efficiency.

### **Interior Design – Luxurious and Sustainable**

Lotus Eletre's interior sets new standards for Lotus, combining performance-oriented design with luxury and sustainability. Materials like Re-Fibre, Ultrafabric polyurethane seats, Alcantara, and Econyl carpets reflect Lotus' commitment to sustainable luxury. The driver-focused cockpit, spacious cabin, and practical storage solutions ensure an exceptional customer experience.

### **A Historic Shift for Lotus**

As the final combustion engine Lotus sports car, the Emira, passes the baton to the Eletre, this all-electric hyper-SUV signifies a new era for Lotus. Combining technical innovation, advanced aerodynamics, and lightweight construction, Lotus Eletre sets a new benchmark for performance, versatility, and usability, appealing to driving enthusiasts worldwide. 🏆

# From Outer Space to Thin Air

by Urvashi Raizada

The Coperni Air Swipe Bag is a landmark innovation that is bringing science and fashion together like never before.



Making its debut at Paris Fashion Week earlier this year, the Air Swipe bag created waves by pushing the boundaries of both design and sustainability.

*“The Air Swipe Bag is a manifestation of our vision for the future of fashion, where sustainability and design innovation go hand in hand.”*

- Arnaud Vaillant

The world of luxury fashion is constantly evolving, with designers continuously pushing the boundaries of creativity and innovation. And one of the most compelling brands leading this charge is Parisian luxury accessories label Coperni. Renowned for its avant-garde approach, Coperni has grabbed media attention on several occasions by presenting novel integrations of fashion and technology. Earlier this year, the innovative brand pushed the envelope once again with the launch of its expectation-defying Air Swipe Bag.

Made from NASA-produced silica aerogel, which has been dubbed as the “lightest solid [material] on planet Earth,” the bag is remarkably made of 99 percent air, but remains durable and is easily recyclable to boot. Bringing together style and science like never before, the Coperni Air Swipe offers the possibility of a sustainable fashion future that could be defined by ingenious materials that are quite literally out of this world.

## Science Fiction Meets Fashion

First made public in a runway show during the Paris Fashion Week in 2024, the Coperni Air Swipe bag challenges the idea of science in relation to fashion. Overall, the design of the bag is a continuation of the brand’s “swipe to unlock” icon-inspired leather bag which features a compact and structured design that is perfect for carrying essentials. However it is the material and composition of the Air Swipe that makes it so unique.

Made of 99 percent air and 1 percent glass, the bag weighs a mere 33 grams. Its lightweight construction was made possible through the use of silica aerogel – a lightweight, durable, and nearly transparent material used by NASA for space exploration. The space agency used this material in its stardust mission, the first spacecraft to bring samples from a comet to Earth in 1999, owing to its ability to withstand extreme heat of up to 1,200 degrees celsius and a pressure of 4000 times its weight.

Aerogels are considered porous, low-density, and solid to the touch – features that Coperni manipulated to create the aesthetic, cloud-like translucent appearance of the bag. The brand developed this innovative accessory by working alongside Ioannis Michaloudis, a visual artist and researcher of silica aerogel at the American University of Cyprus.





Coperni's 2021 futuristic fashion display was made using Fabrican, a patented spray-on material from a can that hardens into wearable textile.

### A Labour of Love and Engineering

The Coperni Air Swipe Bag is more than just a fashion statement – it's a marvel of engineering. Creating silica aerogel involves significant time, expense, and effort. And more so to achieve the clarity seen in the Coperni Air Swipe Bag. Transforming this material into a wearable accessory also involves complex chemical processes, beginning with the careful mixing of chemicals such as sodium silicate, followed by an intensive procedure of ageing, drying, and molding.

While silica aerogel may require expensive and complex chemical processes to produce, it is remarkably easy on the environment as it is made of mostly organic substances and easily recycled. Its porous properties also make it an excellent choice for lightweight, aesthetic and thermally regulated textiles. When combined, these features make for a strikingly efficient material in terms of practicality and waste management.

While the Coperni Air Swipe Bag was constructed primarily as a concept bag, the brand's novel use of silica aerogel represents a significant step forward for the fashion industry. By considering such a novel material, Coperni has opened the floodgates to new sustainable luxury materials that are characterised by versatility, low environmental impact, and recyclability.

### A History of Innovation

Founded in 2013 by Sébastien Meyer and Arnaud Vaillant, both graduates of the prestigious Institut Français de la Mode, Coperni has swiftly risen to prominence in the fashion world. Taking its name from Renaissance astronomer Nicolaus Copernicus, the brand reflects its founders' commitment to innovation and challenging the status quo.

In 2021, for example, the Coperni collection finale featured model Bella Hadid in a 3D spray-on dress that was created live using a sprayable liquid fiber called Fabrican. The display captured the world's attention with its unique application of technology to fashion design, generating a staggering \$26.3 million in media impact value within 48 hours of the show.

Coperni's aesthetic is characterised by sleek lines, minimalist forms, and an almost futuristic sensibility, often incorporating elements of technology in unexpected ways. This marriage of fashion and tech has become a hallmark of the brand, culminating in groundbreaking pieces like the Air Swipe Bag.

### An Ethos for the Future

The development of the Coperni Air Swipe Bag was driven by Meyer and Vaillant's desire to push the boundaries of fashion through innovation. In interviews, the designers have spoken about their fascination with the intersection of science, technology and fashion. Their creations aim to reflect this synergy as well as their ambitions of influencing and inspiring new perspectives.

"We wanted to create something that was not only beautiful but also groundbreaking in its use of materials," says Vaillant. "The Air Swipe Bag is a manifestation of our vision for the future of fashion, where sustainability and design innovation go hand in hand." 🌱



### About The Writer

Singapore-based writer and editor Urvashi Raizada enjoys delving deep into stories that matter, and delivering the whole scoop. She's spent the last 11 years writing about everything from tech and business to luxury and lifestyle, but the stories she loves the most are the ones that make the world a better place.

# The Bvlgari

## Aeterna High Jewellery Watches 2024 Collection

by Priyanka Elhence

Bvlgari unveils the dazzling Aeterna High Jewellery collection, an ode to its unique heritage and Rome's gems and coloured stones.

Bvlgari's unparalleled creativity and craftsmanship are unveiled in the Aeterna High Jewellery collection, a showcase inspired by the magnificent gems from Rome and the Roman Maison's rich cultural heritage.

Bvlgari celebrates its 140th anniversary with *Fuochi D'Artificio*, a collection of stunning timepieces reflecting a starry Italian summer night lit up by vivid fireworks. Radiant motives vibrating with a burst of colours, a result of the bold and daring combination of precious and colour gemstones matched with different metals, ranging from pink and white gold to titanium and platinum. Each piece of watch art is equipped with the Piccolissimo mechanical micro round movement, the smallest round mechanical movement on the market.

The opulent *Fuochi D'Artificio* High-Jewelry Manchette boasts an explosion of bright fireworks in the sky with moving elements, featuring a semi rigid cuff in rose gold and blue titanium, contrasting with dark onyx. A sweeping variety of colourful gemstones complete the creation with sparkling diamonds and hand-cut, polished onyx inserts.



Photos: Bvlgari®





From a central round-cut ruby, a burst of pear-shaped coloured gemstones and round-cut diamonds radiate in the *Fuochi D'Artificio* High-Jewelry Petite Watch, a secret watch with a semi-flexible cuff. Here, Bvlgari combines precious gems with inserts of aventurine, a translucent glass with sparkling inclusions of copper invented in 15th century Venice.

As a tribute to its Greek and Roman history and cultural roots, Bvlgari celebrates iconic mythological animals in its *Animali Fantastici* collection. The ancient Greeks and Egyptians revered the mythical Phoenix, a symbol of renewal, power and immortality. With its ability to continuously be reborn and transform itself, much like Bvlgari itself, the phoenix is Bvlgari Watch Division's creative director Fabrizio Buonamassa Stiglian's choice for the icon of eternity. The mythological animal inspires the *Fenice High-Jewelry* Watch, flanking an exceptionally rare central 9.78-carat Paraiba tourmaline hiding the watch dial. The masterpiece also features over 160 carats of strikingly beautiful gemstones, including blue, pink and purple sapphires, amethysts, rubies, pink garnets, tanzanites, iolites, aquamarines and diamonds for an incredible dégradé effect in the watch's colour palette.

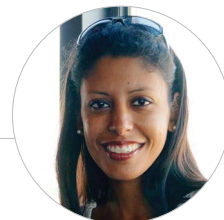
The Phoenix with its prominent extended wings is also the protagonist of the unisex *Fenice Octo Roma Secret* Watch, adorned with brilliant-cut blue, purple and pink sapphires, as well as aquamarines, rubies, and amethysts. White and pink gold spikes enrich the stunning creation, hiding an ultra-thin manual winding mechanical movement with flying tourbillon, complemented by a blue alligator strap.

Bvlgari's most famous heritage design, the serpent, is an emblematic motif in ancient Roman culture, representing



fertility, rebirth, metamorphosis and protection against evil spirits. *Serpenti Misteriosi Chimera* combines the body parts of two emblematic animals in the history of Bvlgari and Rome: the signature snake and the iconic lion, symbols of rebirth and eternity for the former, and of courage and determination for the latter. A sinuous white gold snake with diamond and emerald scales wraps around the wrist boasting both the animal heads, inspired by a Bvlgari archival piece from the 50s, with the head of the snake hiding the Piccolissimo.

And finally, in the year of the Dragon, the snake transforms into the grand mythical creature, the main figure of the *Serpenti Misteriosi Dragone*. This new interpretation of the snake & dragon-shaped watch is a nod to the historic one created for Elizabeth Taylor in 1962 as Cleopatra. Just like that heritage piece, a tubolari bracelet embodies the snake, with its head set with a wave of 32 carats baguette cut diamonds. 🐉



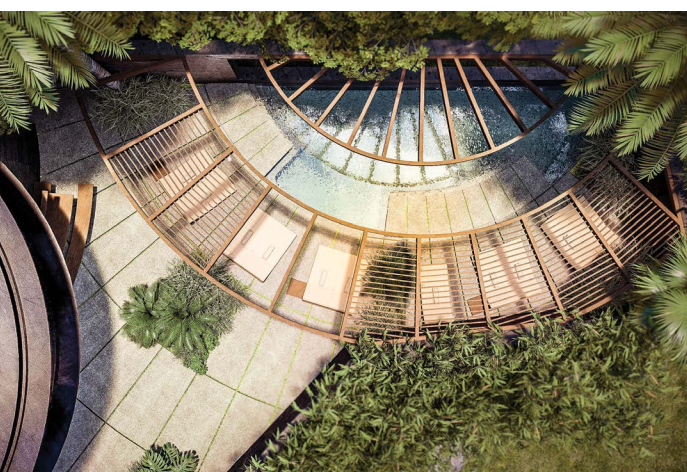
### About The Writer

Bred in The Seychelles and Kenya, Priyanka Elhence studied Hotel Management in Switzerland, coupled with working as a Recruiter in Palm Beach, before doing an MBA in Human Resources Management in London. Calling Singapore home for the past 20 years, Priyanka has been a Freelance Writer now for the past 8 years, writing about everything from luxury and dining, travel and lifestyle, to parenting and finance.



# OXO Living Announces, **OXO The Residences** Bali's Newest All-Villa Project

by Priyanka Elhence



Indonesia's leading neo-luxury developer elevates comfort and luxury living with OXO The Residences, tailored to the tastes of Indonesian homebuyers.

**O**XO Living, a visionary in sustainable boutique property development and management, is set to launch its latest new venture, the luxurious OXO The Residences, in Bali's picturesque Nyanyi area by late 2026.

The IDR 500-billion all-villa project (US\$31 million) conceived in partnership with renowned architect Alexis Dornier, will boast 40 exclusive neo-luxury villas sprawled across two hectares, complete with state-of-the-art communal amenities, and will be integrated into the thriving ecosystem of the adjacent 44-hectare Nuanu City.

Located on the prime Balinese coastline in Tabanan, OXO The Residences is minutes from the central expat hub of Canggu, and Tanah Lot, which is famed for its temples and cultural attractions. With a philosophy that nurtures creativity, fosters connections and promotes holistic well-being, the project is anticipated to be Bali's next landmark destination, following the success of Canggu.





“OXO The Residences is poised to redefine neo-luxury living in Bali. Our commitment to international standards ensures that our developments resonate with both local and global audiences. Residents of OXO The Residences will have exclusive access to the myriad of facilities that the nearby Nuanu City has to offer, enhancing their living experience,” says Johannes Weissenbaeck, founder and CEO of OXO Living.

Reflecting OXO Living’s green credentials, the upcoming development will be equipped with solar panels, rainwater catchment areas, water treatment, osmosis water filters, and recycled or recyclable raw materials. Modern villas, ranging from 184 to 280 sqm, will be designed to appeal to a global clientele, with prices starting at IDR 7.5 billion (US\$500,000).

Alexis Dornier, the visionary architect of OXO The Residences, also shared his aspirations for the project. “Visually, our goal is to deliver a design that is both understated and emblematic. We aspire to create structures that harmonise with Bali’s natural beauty and cultural heritage, prioritising materials that are deeply rooted in the island’s identity and utilising local resources like the readily available bricks from Tabanan and the region’s distinctive volcanic stone.”

OXO Living was founded in Bali in 2015 with a vision to create a lifestyle that inspires and benefits both guests and investors, and has since established a reputation for

uncompromising standards, smart design and premium services. In a strategic pivot from its pre-pandemic focus on international clientele, OXO Living is now courting a predominantly domestic market with OXO The Residences, targeting an 80% local buyer base. This shift aligns with the robust growth of Indonesia’s residential property market, which Mordor Intelligence projects to expand from US\$67 billion in 2023 to US\$72 billion in 2024, and further to an estimated US\$105.7 billion by 2029. To date, OXO Living has developed and owns around 30 properties in Bali worth IDR 700 billion (US\$43 million), consisting of private residences, villas, townhouses, co-working studios, resorts and a 20-metre yacht in the Komodo National Park.

“Our collaboration thrives on a shared commitment to sustainability. We believe in the ethos of ‘building less to create more value, ensuring our developments are in harmony with the environment, a philosophy that is the cornerstone of a partnership that seamlessly blends architectural innovation with ecological consciousness,” says Dornier.

Weissenbaeck continues by saying, “Presently, Bali is undergoing a transformative shift in its property industry, fuelled by the emergence of the neo-luxury trend, a niche market that OXO Living is uniquely positioned to thrive in. All OXO Living property projects embrace the principles of zero waste, solidifying our expertise in sustainable development.” 🌱

Soneva harnesses the power of

# solar energy

for more sustainable and eco-friendly luxury

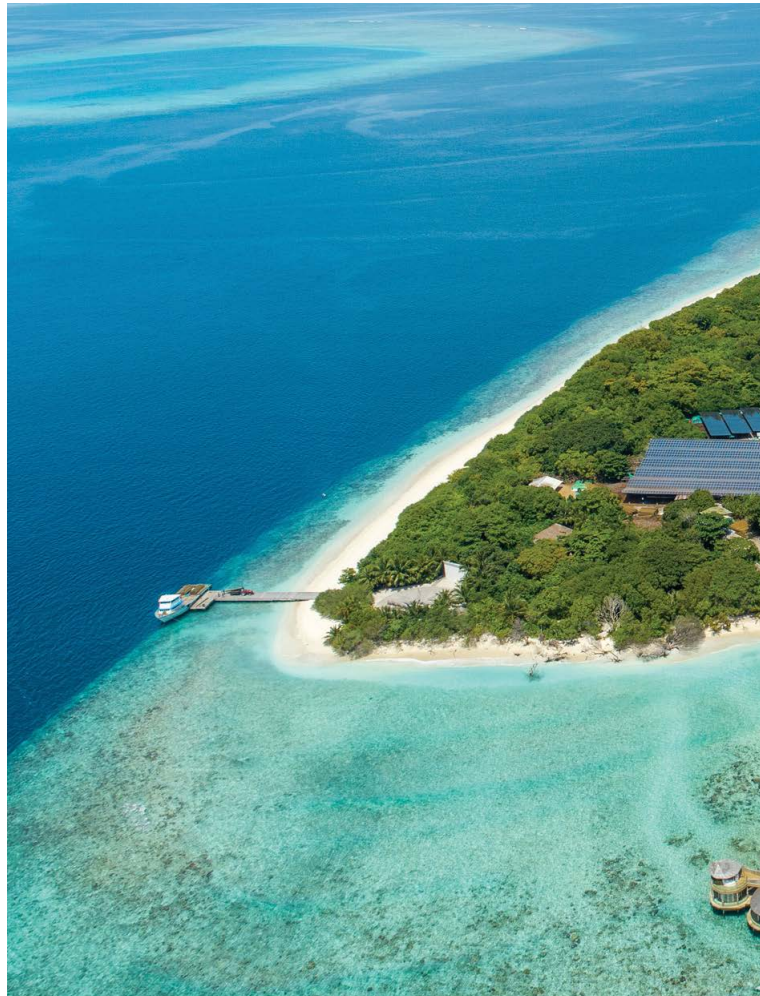
by Priyanka Elhence

Soneva Fushi and Soneva Jani target 50 percent of energy being derived from solar power in 2024.

Since 1995, Soneva, the award-winning sustainable luxury resort operator, has always been committed to a sustainable and eco-friendly footprint. And now the luxury group is making significant strides in its commitment to renewable energy in the Maldives, with a focus on solar energy. Leading the hospitality sector's transition towards clean energy and a zero-carbon future, Soneva is on a mission to achieve fully carbon-free operations across both its Maldives resorts by this year.

Both Soneva Fushi in the Baa Atoll and Soneva Jani in the Noonu Atoll have already been carbon neutral since 2012, and now they are aiming to achieve 50 percent of their energy to be generated from photovoltaic (PV) sources, thanks to the addition of new PV installations. Previously, the PV system at Soneva Fushi had supplied approximately only 12 percent of the resort's energy load. Incidentally, Soneva Fushi was also the first resort in the Maldives to install a solar power facility in 2008 to reduce operating costs by harnessing the island nation's abundant natural sunshine.

And now, Soneva has expanded its development of solar power with the US\$ 10 million funding from German-headquartered Aareal Bank in December 2022. This



Photos: Soneva





*“Our investment in solar energy demonstrates our commitment to sustainability, while contributing positively to our bottom line.”*

- Bruce Bromley

has seen Soneva Fushi’s solar installations totalling to 2.55 MWp (megawatt peak) of power and 2.7 MWh (megawatt hours) of battery capacity, while at Soneva Jani, the installations totalled up to 2.75 MWp of power and 2.0MWh of battery capacity.

“Our investment in solar energy demonstrates our commitment to sustainability, while contributing positively to our bottom line,” says Bruce Bromley, chief financial officer and deputy CEO at Soneva. “Embracing solar power on such a significant scale has substantially reduced our carbon footprint and demonstrate what is possible in the hospitality industry. The invaluable support from Aareal Bank has paved the way in integrating our energy systems with other renewable technologies, propelling us closer to our goal of achieving fossil fuel-free operations.”

"The financial sector plays a decisive role in the property sector transitioning towards a carbon-free future. At Aareal Bank, we are embracing this responsibility. It gives us great satisfaction to witness our joint

efforts bearing fruits and contributing to sustainable development on multiple fronts," states Thomas Adaemmer, managing director and head of Asia-Pacific at Aareal Bank.

To better harness the full potential of solar energy, the brand new Soneva Secret 2024 resort, located in the Maldives’ remote Haa Dhaalu Atoll, has also implemented floating solar panels in the surrounding ocean, and on land, which are expected to cover nearly 90% of the resort’s energy load.

Soneva is also further expanding its existing sustainability strategies, such as rainwater harvesting and load shifting, to maximise the utilisation of renewables, while assessing alternative storage technologies to further enhance energy usage. These include flow batteries that offer longer lifespans and the capacity to store substantial amounts of energy, as well as thermal storage to sustain and regulate renewable heat. 🌿



A brand new turtle-inspired  
stay experience awaits at  
**Jumeirah Al  
Naseem**

by Priyanka Elhence

To commemorate the 20-year-anniversary of Jumeirah's Dubai Turtle Rehabilitation Project (DTRP), Jumeirah Al Naseem has introduced an exclusive guest experience dedicated to ocean conservation.





Photos: Jumeirah Al Naseem

**D**TTRP is run in collaboration with Dubai's Wildlife Protection Office, with support from Dubai's Royal Family veterinary facilities and laboratory work provided by the Central Veterinary Research Laboratory (CVRL). The project has been instrumental in releasing over 2,150 rehabilitated turtles back into their natural habitats since 2004. 86 of these turtles are monitored by satellite tracking.

After receiving initial treatment at Jumeirah Burj Al Arab's Aquarium, the turtles are moved to the resort's state-of-the-

art Turtle Rehabilitation Sanctuary before they are released. The project also runs an educational programme for school groups to deepen their understanding of the DTRP's work, the significance of these incredible creatures, and the challenges they face in their survival. This programme attracts around 1,700 school children from the seven emirates annually.

"As we celebrate 20 years of DTRP, and in view of the threats our oceans face, it is more important than ever to raise awareness of the critical conservation work being done to protect sea turtles," said Barbara Lang-Lenton, director of Aquarium at Jumeirah Burj Al Arab. "Initiatives like the turtle-inspired stay experience at Jumeirah Al Naseem not only offers guests a distinct and memorable experience, but it also provides a deeper awareness and vital support to the DTRP's efforts in rehabilitating and releasing these endangered species back into the wild."

Offering a range of specially curated experiences, the brand new Jumeirah Turtle Stay Experience includes a guided tour of the turtle rehabilitation facilities, starting with a behind-the-scenes tour of the Aquarium at Jumeirah Burj Al Arab where rescued turtles start the journey to recovery. From turtle-inspired welcome amenities to a behind-the-scenes look at the remarkable work of the project, every aspect of this experience is designed to provide a unique and meaningful stay.

The tour extends to the Turtle Rehabilitation Sanctuary at Jumeirah Al Naseem, comprising five outdoor lagoons, where resident turtles rebuild strength before being released back into the wild. Guests can also take part in the turtle feeding. A portion of the stay rate will be donated to the cause.

Complementing the experience is also the brand-new, limited-time only, ocean-themed four-hands Turtle Inspired Afternoon Tea at the luxurious Al Mandhar Lounge. This inaugural collaboration sees executive pastry Chef Julien Jacob teaming up with his mentor, renowned pâtissier and chocolatier Philippe Rigolot, to craft a special menu featuring signature savouries and sweets, and nostalgic creations inspired by childhood candies, served on ornate turtle tea stands, adorned with repurposed coral and marble.

Starting at AED 2,025++, this unique turtle-inspired stay experience (for a minimum of two nights) includes:

- Daily buffet breakfast
- Turtle-inspired welcome amenities
- Ocean-themed four-hands Afternoon Tea experience served at Al Mandhar Lounge from executive pastry Chef Julien Jacob and renowned pâtissier and chocolatier Philippe Rigolot
- Exclusive guided tour to the turtle rehabilitation facilities and aquarium at Jumeirah Burj Al Arab
- Guided tour and feeding at the Turtle Rehabilitation Lagoon at Jumeirah Al Naseem
- Complimentary selected non-motorised water sports
- Unlimited access to Wild Wadi Waterpark™
- Use of wellness facilities at Talise Spa, Talise Fitness and J Club
- Access to KiDS Club at Jumeirah Al Naseem for junior guests
- Collect exclusive Jumeirah One Points when you book direct through Jumeirah
- Access to a map link that enables guest to track the turtles that have been released 🐢





Photo: Freepik

# Innovative Green Architecture Homes of the Future

by Christina Yip

In recent years, a profound shift has been taking place in the realm of architecture. The focus has shifted from mere aesthetics and functionality to incorporating sustainability at its core. This evolution has given rise to a new wave of architectural marvels that not only redefine luxury living but also prioritise environmental responsibility. These eco-friendly luxury homes and buildings serve as beacons of innovation, blending cutting-edge design with sustainable practices to create spaces that are both breathtaking and conscientious.

## Pushing Boundaries: Architects at the Forefront

Architects around the world are leading the charge in redefining what luxury means in the context of green architecture. One such visionary is Ken Yeang, renowned for his bio-integrated skyscrapers that seamlessly blend with the

natural environment. Yeang's designs, such as the Eco Tower in Kuala Lumpur, Malaysia, are characterised by extensive greenery, energy-efficient systems, and a harmonious coexistence with nature. Ken Yeang's perspective on green architecture emphasises a holistic approach that integrates ecological principles with architectural design. According to Yeang, "The future of architecture lies in creating symbiotic relationships between buildings and their environments. It's about designing structures that not only minimise their environmental footprint but actively contribute to the surrounding ecosystem."

In the Netherlands, Stefan Boeri has gained acclaim for his innovative approach to urban greenery with projects like the Vertical Forest in Milan, Italy. These skyscrapers are adorned with thousands of plants, contributing to improved air quality while providing a unique aesthetic appeal.



### Eco-Luxury Living: Experiences from Homeowners

Eco-luxury living represents a compelling fusion of luxury and environmental responsibility, epitomised by architectural marvels like The Edge in Amsterdam. Designed by PLP Architecture, The Edge stands as a beacon of sustainable urban development. Its integration of solar power, rainwater harvesting, and advanced ventilation systems not only enhances energy efficiency but also reduces environmental impact.

Residents of eco-luxury spaces such as The Edge experience a heightened quality of life, benefitting from improved indoor air quality, natural lighting, and innovative technologies that promote both comfort and sustainability. Beyond the environmental advantages, these homes often offer long-term cost savings through reduced energy consumption and a sense of community among like-minded individuals committed to sustainable living.

As cities worldwide grapple with the challenges of urbanisation and climate change, the demand for eco-friendly housing continues to rise. Architects and developers are increasingly embracing innovative design solutions and sustainable practices to meet this demand, ensuring that future residential developments prioritise both luxury and environmental stewardship.

### Sustainable Materials and Renewable Energy

In the realm of sustainable architecture, the use of innovative building materials and renewable energy sources is reshaping the construction industry. Architects are increasingly opting for materials like recycled steel, reclaimed wood, and bio-based composites to reduce carbon footprints and promote a circular economy. These materials not only conserve natural resources but also enhance indoor air quality and contribute to healthier environments.

A notable example is the Brock Commons Tallwood House in Vancouver, Canada, designed by Acton Ostry Architects. This 18-storey residential tower showcases the potential of timber construction, offering structural integrity, energy efficiency, and significant carbon sequestration benefits. Advanced timber engineering techniques like cross-laminated timber (CLT) and glue-laminated timber (glulam) demonstrate how wood can be used effectively in high-rise buildings while supporting sustainable forestry practices.

Looking ahead, the future of sustainable architecture lies in continued innovation and integration of these materials and technologies. Embracing a lifecycle approach to building design ensures that environmental impacts are minimised from construction through to operation and eventual disposal. As global awareness and demand for sustainability grow, architects and developers are poised to lead the way towards an eco-friendlier built environment.

### Integrating Nature into Urban Spaces

Beyond individual buildings, architects are reimagining entire urban landscapes to incorporate green spaces and biodiversity. Singapore exemplifies this trend with its visionary approach to urban planning, featuring rooftop gardens, vertical greenery, and eco-friendly infrastructure.

In Singapore's Punggol Eco-Town, residential developments are designed to blend seamlessly with the natural environment. These eco-friendly neighborhoods prioritise pedestrian pathways, public parks, and efficient waste management systems, fostering a sense of community while minimising environmental impact.

### Challenges and Future Prospects

Despite the progress made in green architecture, challenges remain. Cost implications, regulatory frameworks, and public perception are significant barriers to widespread adoption. However, architects and developers are optimistic about the future, driven by technological advancements, growing environmental awareness, and evolving consumer preferences.

Innovative green architecture represents a convergence of visionary design, environmental stewardship, and luxury living. Architects and homeowners alike are embracing this paradigm shift, creating spaces that are as sustainable as they are stunning. As we look to the future, these examples serve as inspirations for a world where architecture not only respects nature but actively contributes to its preservation. 🌱



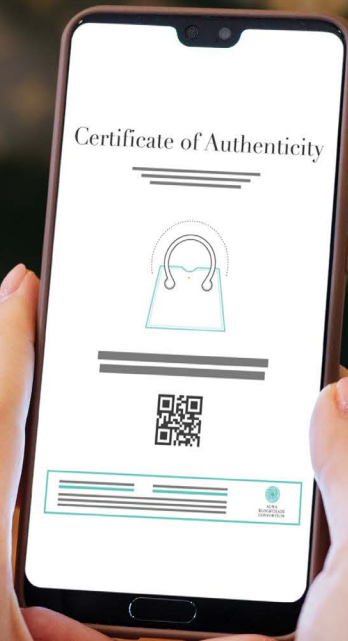
#### About The Writer

Having led and transformed fintech and blockchain companies across Asia since 2015, Christina is an accomplished chief marketing strategist. Her impressive track record includes accelerated growth in startups, ICO structuring, and leading marketing initiatives in various blockchain consultancy firms that worked with more than 200 blockchain projects, including Chainlink, Elrond, EOS, VeChain, NEO, Harmony, and Zilliqa. She is an expert in building effective distribution channels, forming strategic partnerships, and delivering high-impact advertising for customer acquisition, especially in the blockchain industry. Christina is also legally trained and has been actively involved in regulatory compliance topics in digital assets and emerging technologies. She is enthusiastic about the transition to Web 3.0 and believes in the creator economy fueling SocialFi projects.

# A Sustainable Aura for the **Luxury Industry**

by R Jacob

There's an Aura surrounding the luxury industry –  
but it's not magic, it's blockchain technology.



Photos: Freepik and Vecteezy



*Through Aura, brands can build trust with their customers and safeguard their reputation in the competitive luxury market.*

**L**uxury and sustainability are not words you normally hear together in the same sentence – in fact, they are usually polar opposites. Times are changing, however, and people are more aware of the consequences of human actions on the natural world. The luxury industry is under increasing pressure to adhere to environmental regulations, and consequently, transition their businesses into a model that is sustainable for the planet.

Many of the big names in the industry have already begun switching to models that incorporate multiple aspects of sustainability. Efforts typically involve use of organic components, ethical sourcing of labour and raw materials, renewable resources, and more. Interestingly, one unlikely issue that impacts sustainability are the problem of counterfeits. With no solution in sight, a number of industry veterans came together to form the Aura Blockchain, aiming to tackle the problems plaguing the luxury industry, and thereby improving the sustainability of the overall ecosystem.

### **One for All, and All for One**

The Aura Blockchain Consortium was developed as part of a collaborative effort between major luxury brands LVMH (Louis Vuitton, Bulgari, Hublot), Prada Group, and Cartier. Conceived as a response to the growing demand for transparency and authenticity in the industry, Aura leverages blockchain technology to enhance traceability and sustainability within the luxury sector. The primary motivation was to create a shared platform that could verify the authenticity of luxury goods and provide detailed product histories, thereby enhancing consumer trust and promoting sustainable practices.

Counterfeiting is another major problem in the luxury industry that Aura intends to address. All too often, you hear of unsuspecting customers excitedly acquiring what they believe to be a unique and prized piece for their collection, only for them to later discover that they have been duped into purchasing a counterfeit – despite paying thousands of dollars for it. This scenario is extremely common in the luxury trade, where the allure of high-end goods attracts not only eager consumers but also a thriving black market of counterfeit goods.

Reputed brands lose billions of dollars each year to the counterfeit trade. The global trade in counterfeit goods is estimated to be worth over \$500 billion, with luxury items

like handbags, watches, and clothing making up a significant portion of this market. The problem extends beyond financial loss – it undermines brand reputation, erodes consumer trust, and often funds illegal activities. Often, a significant amount of resources is spent on curbing the production and sale of counterfeits.

This is where Aura enters the picture. It aims to address all these issues in an efficient manner through the use of blockchain technology. Important information such as certifications, detailed product life cycles, suppliers, etc are stored for every product. All the data is stored on a blockchain, an immutable ledger that requires every other node on the blockchain to approve any changes being made. Effectively, this ensures that the data cannot be altered or tampered.

### **Hitching the Supply Chain to the Blockchain**

Primarily, Aura solves a number of supply chain problems by providing detailed information on how goods are obtained. This includes data on specific mines or farms where raw materials are sourced, ensuring that materials are ethically sourced and comply with environmental standards. The platform also tracks the entire manufacturing process, detailing each step from raw material to finished product. Data on energy consumption, waste management, and the use of chemicals are all tracked and monitored. By offering this level of detail, Aura enables brands to identify areas for environmental improvements and optimise their production processes to increase sustainability. The suppliers involved in the production process are listed as well. This transparency allows consumers to verify that each supplier adheres to sustainable practices, further promoting ethical sourcing and manufacturing.

Aura has also been setting the bar for companies to meet their compliance for environmental certifications such as Fair Trade, Rainforest Alliance, and other standards that promote sustainable and ethical practices. By providing verifiable data on sourcing and production, Aura supports brands in meeting these standards and enhancing their credibility. Brands also benefit by being able to benchmark their progress against industry standards. Consumers with access to brand and product histories can then make more informed decisions, choosing products that align with their values regarding sustainability and ethics. This increased awareness drives demand for sustainably produced luxury goods, encouraging more brands to adopt ethical practices.



Counterfeit prevention is also taken care of by Aura. Every product on the Aura platform has a unique digital certificate, making it easy for consumers and retailers to verify authenticity. This reduces the demand and circulation of counterfeit goods, which are often produced without regard for environmental or ethical standards. Consequently, resources are not wasted on producing fake goods. Brands also save on valuable time and resources spent on cracking down on the trade of counterfeit goods. Unlike counterfeits, authentic goods are made to higher standards, and have a much longer lifespan and better environmental footprint.

Another way in which Aura supports sustainability is through encouraging circular economy practices. Aura's blockchain tracks the entire lifecycle of a product, including resale and recycling. This supports the circular economy by promoting the reuse and recycling of luxury goods, helping reduce waste and the demand for new raw materials. By providing detailed maintenance and care instructions, Aura helps consumers extend the life of their luxury items, further reducing waste and environmental impact. Aura also supports the second-hand market for luxury goods by ensuring that resale items are authentic, and their histories are fully traceable. This



encourages consumers to buy pre-owned items, reducing the demand for new products and the associated environmental impact. The platform can integrate with recycling programs, ensuring that end-of-life products are properly recycled rather than discarded, minimising environmental impact.

### Leading by example

Several leading luxury brands have now successfully integrated Aura into their operations, showcasing the platform's potential to drive positive change in the industry. Notably, and perhaps unsurprisingly, all the founding members use Aura intensively.

Louis Vuitton was one of the first luxury brands to integrate Aura into its operations. The brand uses the blockchain to offer customers a digital passport for their products. This digital certificate allows customers to verify the authenticity of their luxury items at any point, ensuring they are purchasing genuine Louis Vuitton products. Additionally, the blockchain tracks the entire lifecycle of the product, from sourcing materials to production, distribution, and resale.

Bulgari uses Aura to certify the authenticity and provenance of its jewellery and watches. By scanning a QR code, customers can access the complete history of their product, including the origin of the gemstones, the craftsmanship involved, and the ethical standards adhered to during production. This builds trust and reassures customers about the quality and authenticity of their high-value purchases.

Hublot employs Aura to offer a digital certificate of authenticity for its luxury watches. Like other items on the blockchain, this certificate is immutable, meaning it cannot be tampered with. Customers can use this certificate to prove the authenticity of their watch when reselling it, which also helps maintain the value of the timepiece.

Prada uses the Aura blockchain to enhance transparency across its supply chain. For instance, the brand provides detailed information about the sourcing of raw materials, such as leather and fabrics, used in its products. This includes data on the farms or processing plants where the materials were obtained, ensuring they meet high ethical and environmental standards. Prada customers can also access information about the production process, including the craftsmanship and techniques used, fostering a deeper connection between the consumer and the product.

Cartier uses Aura to authenticate and track its high-end jewellery and watches. The brand ensures that each piece is accompanied by a digital certificate stored on the Aura blockchain. This certificate provides detailed information about the sourcing of precious metals and stones, the craftsmanship involved, and the product's journey from production to sale.

These illustrate how Aura is helping luxury brands maintain authenticity, transparency, and sustainability – factors which are increasingly critical for today's consumers. Through Aura, brands can build trust with their customers and safeguard their reputation in the competitive luxury market. Till date, Aura has logged in more than 40 million products onto its blockchain and are actively adding more every month.

### Slow and Steady

Despite its success, the adoption of Aura has not been without challenges. Initial resistance from industry players, the need for extensive data collection, and the integration of blockchain technology into existing systems have posed significant hurdles. However, the benefits of enhanced transparency, sustainability, and consumer trust far outweigh these challenges.

Nonetheless, Aura aims to expand its reach and capabilities. Future developments may include integrating more advanced technologies, such as artificial intelligence and Internet of Things (IoT), to further enhance data accuracy and traceability. Additionally, Aura plans to collaborate with even more luxury brands and sectors, broadening its impact on sustainability and transparency.

### The future of Sustainable Luxury

As the consumer demand for transparency and sustainability continues to grow, initiatives like Aura will play an increasingly vital role in shaping the future of the luxury market. Aura represents a significant advancement in the luxury industry that addresses critical issues of authenticity, transparency, and sustainability. By leveraging blockchain technology, it has created a platform that not only combats counterfeiting but also promotes ethical and environmental practices. Through its innovative and technical approach, Aura is paving the way for a more sustainable and responsible luxury industry, benefiting brands, consumers, and the planet alike. 🌱



#### About The Writer

*Jacob is a writer with a strong tech background. An engineer turned writer/artist, he has varied interests encompassing technology, flow arts, music and entrepreneurship. Having worked in the IT and EduTech industry before moving on to establish his own business, he believes in employing a multi-faceted approach in all his endeavours.*



# The Green Evolution

How Singapore's Laws Foster Sustainable Living

by Ignatius Tan Gim Wee





Policy and legislative frameworks play a pivotal role in shaping sustainable practices across various sectors in Singapore. In an era of increasing environmental consciousness, the integration of sustainability into everyday life is not merely a trend but a legal imperative. This article examines some of the policy and legislative measures that facilitate this alignment.

### Policy Context

Sustainability-related laws in Singapore exist within a larger policy context. This context is based on the Sustainable Singapore Blueprint and the Singapore Green Plan 2030.

Singapore's commitment to sustainability is encapsulated in its Sustainable Singapore Blueprint, a comprehensive policy

document that outlines the nation's long-term vision for sustainable development. This blueprint covers a wide range of critical areas including the economy, society, environment, and governance. Legal mandates derived from this blueprint provide a robust foundation for integrating sustainable practices into both high-end residential and commercial developments, setting the overall direction for Singapore's sustainable journey.

The Singapore Green Plan 2030 is a comprehensive national strategy aimed at achieving environmental sustainability goals within the broader framework of the Sustainable Singapore Blueprint. Launched in February 2021, the plan outlines Singapore's environmental targets over the next decade and is structured around five key pillars:

1. City in Nature
2. Sustainable Living
3. Energy Reset
4. Green Economy
5. Resilient Future

### Resource Sustainability Act

Building on the foundation of the Sustainable Singapore Blueprint and the Singapore Green Plan 2030, the nation has advanced its commitment to sustainability through targeted legislative measures. Among these is the Resource Sustainability Act 2019, which is a key piece of legislation aimed at fostering a more sustainable and resource-efficient Singapore. Its primary focus is on addressing three major waste streams: e-waste, food waste, and packaging waste.

#### Key features of the Act include:

- **Producer Responsibility:** Imposing obligations on producers of electrical/electronic waste, and food waste to manage their products at end-of-life. This includes setting up collection and recycling systems.
- **Packaging Management:** Requiring companies importing or using packaging in Singapore to report packaging data and develop reduction, reuse, and recycling plans.
- **Food Waste Management:** Mandating on-site food waste treatment for large food waste generators, promoting a circular economy approach.
- **Regulatory Framework:** Establishing a regulatory framework for producer responsibility schemes, ensuring proper management of waste.
- **Data Collection:** Requiring the reporting of packaging data to inform policy development and waste management strategies.

By implementing these measures, the Act aims to reduce waste generation, promote recycling and encourage a more circular economy in Singapore.

**Carbon Tax**

The Carbon Pricing Act 2018 is part of Singapore’s strategy to reduce greenhouse gas emissions and transition to a low-carbon economy. Its primary objective is to impose a tax on greenhouse gas emissions from specific facilities.

**Key features of the Act include:**

- **Carbon Tax:** Imposing a tax on greenhouse gas emissions produced by facilities emitting 25,000 tonnes or more of greenhouse gases annually.
- **Tax Rate:** Progressively increasing the carbon tax rate to incentivize emissions reduction.
- **Reporting Requirements:** Mandating covered facilities to report their greenhouse gas emissions annually.
- **Regulatory Framework:** Establishing a regulatory framework for the implementation and enforcement of the carbon tax.
- **Revenue Generation:** Using the carbon tax revenue to support government initiatives related to climate change mitigation and adaptation.



*Singapore has been proactive in developing a robust legal and regulatory framework to support green finance, having implemented a series of laws, regulations, and initiatives to foster a sustainable financial ecosystem.*



By pricing carbon emissions, the Act aims to encourage businesses to adopt cleaner technologies and processes, thereby reducing their environmental impact.

The implementation of the Carbon Pricing Act 2018, along with other key legislations such as the Resource Sustainability Act, underscores Singapore's commitment to reducing greenhouse gas emissions and fostering a sustainable environment. However, achieving comprehensive sustainability requires a multifaceted approach that extends beyond specific laws. To this end, Singapore has introduced a range of policy measures designed to promote sustainability across various sectors.

### Green Finance and Investment

To support the transition towards a low-carbon economy, the Monetary Authority of Singapore (MAS) has positioned Singapore as a leader in green finance. Singapore has been proactive in developing a robust legal and regulatory framework to support green finance, having implemented a series of laws, regulations, and initiatives to foster a sustainable financial ecosystem. The key legal and regulatory areas include:

- **Green Bond Framework:** Singapore has established a robust green bond framework aligned with international standards, providing clarity and credibility for issuers and investors.
- **Tax Incentives:** The government offers tax incentives for green investments and projects, encouraging private sector participation in sustainable initiatives.
- **Disclosure Requirements:** Increasing emphasis is placed on environmental, social, and governance (ESG) disclosures, promoting transparency and accountability in the financial sector.
- **Climate-Related Financial Risks Management:** MAS has introduced guidelines for financial institutions to assess and manage climate-related financial risks, enhancing the resilience of the financial system.
- **Sustainable Finance Labelling:** Initiatives are underway to develop clear and consistent labelling standards for green financial products, facilitating investor decision-making.

### Green Mark Certification Scheme

The Green Mark is a certification scheme developed by the Building and Construction Authority (BCA) in Singapore to recognise buildings that are environmentally friendly and sustainable. It assesses buildings based on various criteria, including energy efficiency, water conservation,

waste management, indoor environmental quality, and site sustainability. By encouraging sustainable design and construction practices, the Green Mark aims to promote a greener built environment and improve the overall quality of life in Singapore.

### Electric Vehicles and Green Transport

Singapore's policy framework promotes the adoption of electric vehicles (EVs) through generous incentives and regulatory measures aimed at phasing out internal combustion engine vehicles by 2040. This transition is transforming the automotive market, where EVs represent a fusion of advanced technology and sustainability, driven by a robust policy infrastructure.

### Zero Waste Masterplan

Singapore's Zero Waste Masterplan aims to reduce waste sent to landfill by 30% and achieve an overall recycling rate of 70% by 2030. It focuses on shifting from a linear "take-make-dispose" model to a circular economy. Key strategies include reducing waste generation, promoting recycling, and transforming waste into valuable resources. The plan targets specific waste streams like e-waste, food waste, and packaging, with measures such as producer responsibility schemes and infrastructure development.

### Conclusion

Singapore has established a robust legal and regulatory framework to underpin its sustainability goals. A multifaceted approach, encompassing statutory mandates and policy instruments, characterises the nation's commitment to environmental stewardship. From the Resource Sustainability Act to the Carbon Pricing Act, Singapore's legislative landscape demonstrates a proactive stance on resource efficiency and climate change mitigation. This comprehensive framework, coupled with ongoing policy refinements, positions Singapore as a regional frontrunner in sustainable development and provides a solid foundation for future environmental initiatives. 🌱



#### About The Writer

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