Philanthropy, Investment and the Pecuniary Architecture of Bioscience Laboratories

Sandra Kaji-O'Grady

Abstract
New buildings extract and solidify liquid capital, converting it into tangible assets the capital value of which is subject more to the dynamics of real estate and financial markets than it is to architectural fashions. Architecture, however, remains actively engaged in the circulation of capital by enabling pecuniary relationships. This paper is concerned specifically with the relationship between bioscience research organizations and funding bodies and the ways in which architecture functions to attract and influence niche circles of investors and philanthropists. Architecture's role is revealed in the recent architectural commitments and financial activities of two biosciences research institutions: The Cold Spring Harbor Laboratory on Long Island, New York and the J. Craig Venter Institute in La Jolla, California. The nostalgic architecture of the CSHL's Hillside Campus mirrors the taste culture and lifestyles of the old money East Coast families who sit on the CSHL's Board and fund its operations. The JCVI's exploitation of an architecture of environmental sustainability, on the other hand, successfully targets a new breed of biotech entrepreneur.

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Introduction

The anguished cry of 'my money not good enough for ya?' is a familiar cinematic trope. Indeed, its ubiquity suggests the distinction between monetary wealth and the attributes of class, is widely understood, regardless of whether or not one has digested the theoretical musings of Thorstein Veblen or Pierre Bourdieu. Veblen's analysis looked at how the wealthy at the turn of the last century managed to maintain and accrue more money, not through work, but through careful financial investments made as a result of contacts forged in elite social and leisure settings (Veblen, 1899). Subsequently, in *Distinction* (1984), Bourdieu proposes that if the deployment of tastes in everyday life reproduces social class boundaries, then it is plausible to breach those boundaries through the appropriation of material and cultural signifiers (Bourdieu, 2007). Veblen, too, had observed that wealth does not in itself serve as admission to the upper classes – access depends on the adoption of an acceptable set of values and lifestyles. Those values and lifestyles vary according to whether one's wealth is self-made or inherited, by race and nationality, and even, more narrowly by city and region. While the self-made *nouveau riche* and the aspirational middle-classes spend on luxury goods, old money invests its wealth on enhancing relationships. Instead of conspicuous consumption, old money favours inconspicuous consumption – spending on services, education, experiences, health, privacy and security. Giving money away is one of those experiences. Not only does it feel good, it strengthens relationships amongst other elites, thereby accruing social capital and distinction. Targeting one's charitable giving to research and research institutions can also be an investment in the health and education of one's descendants.

The ostensible goal of philanthropy is to advance society by providing the resources for services, such as research, where the state or market have – in the view of the philanthropist – abrogated responsibility. Philanthropy constitutes a win-win relationship between donors and receivers, the receiver gains material and financial support, the donor social advantages. Following Bourdieu's concept of capital exchange, it is also possible to use philanthropy to convert new money into social and cultural power and, thus, to integrate oneself into a social group. Philanthropy is a social practice. It defines social distinctions and characterizes the elite. Coming together on the boards of charities and gala fund-raising events is as important in defining cultural capital as attendance at polo matches or membership of sailing and golfing clubs. Philanthropy, though, does more than build social capital. As Adam observes, 'philanthropy always has something to do with power and the shaping of the future of society' (Adam, 2004: 5). In selecting this or that project to support, donors exercise power and this is especially evident in scientific research. Lord Sainsbury of Turville, for example, gave USD108 million (82 million pounds) to fund the construction of the Stirling Prize-winning Sainsbury Laboratory (2010) for plant research at the University of Cambridge. Sainsbury had shares in plant bioscience firms as well as the grocery chain when, as the UK Minister for Science and Innovation in Blair's government, he campaigned for the acceptance of genetically modified food (Giles, 2006). Not all donors are so obviously self-interested but, as Nickel attests, 'the pursuit of ostensible social change through genuine social exclusivity is one of the key practices through which governing takes place' (Nickel, 2016: 13).

Philanthropy is also an economic practice and by-product, for it necessarily arises out of situations in which a small minority of individuals accrue financial excess. Getting rich for Žižek is 'a violent process of appropriation which casts doubt on the right of the rich giver to own what he then generously gives' (Žižek, 2016). That is, philanthropy is a practice that valorizes the wealthy and benevolent subject and addresses a deficit in governing at a time when inequality is pronounced. Ostentatious forms of philanthropy are a kind of disinfectant against possible opposition to wealth concentration and inequality (Nickel, 2016: 26).

Extending this view, it could be argued that philanthropy *produces* the demand for scientific research. Philanthropists need scientific research to mop up financial excess in ways that appear to be altruistic (and at the same time receiving, in most countries, tax concessions). As a consequence, the types of research supported by philanthropy tend to be in fields that have the emotional appeal of 'blameless' beneficia-

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ries, such as childhood cancer, and other translational medical research (Murray, 2013). Philanthropists in the US, Callahan observes, support market solutions and technocratic fixes, thus favoring the latest medical innovation over, say, ensuring decent housing for the poor (Callahan, 2017). With few exceptions, as Murray's statistical analysis reveals, their gifts go to already well-funded wealthy fields and institutions, instead of filling gaps (Murray, 2013). And with dwindling state investment in basic scientific research in the US, Europe and Australia, philanthropic funds and interests play an increasing part in what science gets done. Research institutions in the U.S. received more than $2.3 billion for basic science research in 2017 from foundations, philanthropists, corporations, and charities, an increase of 40% over the last three years (Science Philanthropy Alliance, 2018). At the same time, according to the National Science Foundation; federal funding of basic science research expenditures at higher education institutions as a percentage of GDP declined 30% from 2003 to 2015.

There are growing concerns that the interests of elite philanthropists are distorting and overly-influencing science, policy, economies, and social change (Fleishman, 2009; Zunz, 2014). Murray wonders how governments and scientists should respond to 'directions spurred by a few wealthy individuals, whose research preferences may be highly idiosyncratic or not well matched with broader social goals' (Murray, 2013). Despite these concerns, contemporary scientific research is increasingly energized by the need to attract private wealth. Hence, the research sector has established considerable infrastructure – staff, events, projects – to solicit philanthropy. This infrastructure aims to establish a personal and emotional identification between philanthropists and research organizations. To understand exactly what this has to do with architecture, we need to look closely at how philanthropy plays out in architectural choices and effects. Campaigns for the construction of new laboratories are typically structured around images and narratives made by architects of a proposed building, fueling the demand for buildings to have an iconic image and an easily grasped story. The two examples in this essay, however, mobilize their existing architecture to maintain and grow support. Images of their buildings and grounds feature on their websites, annual reports, and other communications collateral. The CSHL offer public tours of their 120-acre site and has celebrated its architecture and landscaped grounds in two lavishly illustrated books (Watson, 1991; Watson, 2008). A detailed forty-page booklet on the JCVI building, with architectural plans and technical information is downloadable from their homepage. The architectural choices made by each organization are used to reinforce their research ambitions, their institutional identities, and their place in the world. More importantly, architecture makes it possible for philanthropists to feel 'at home' with an organization, and to see themselves as a part of the scientific community they support.

Cold Spring Harbor Laboratory and its Old Money Neighbors

The Cold Spring Harbor Laboratory grew from two co-located but operationally distinct institutions that merged in 1963 – the Bio Lab and the Carnegie Institute. From the beginning, both were conceived, funded and, sometimes, managed by private donors. John D. Jones, Bio Lab co-founder and whaling fortune heir, put up USD5,000 to build a Fish Hatchery and Biological Laboratory there in 1893 – a timber building in the Colonial Revival Style. In 1904, the Jones family foundation, the Wawepex Society, leased ten acres of land for fifty years to the Carnegie Institution of Washington for a Station for Experimental Evolution, under the leadership of Charles Davenport. Davenport promptly built himself a grand house, justifying the expense on the basis that the house made it possible to 'pay some of the social debts that had accumulated' (Watson, 1991: 71). It was in this same decade that New York's wealthy industrialists built their suburban mansions along Long Island's North Shore coast – a place and a period immortalized in F. Scott Fitzgerald's novel *The Great Gatsby* (1925). At the turn of the twentieth century, the CSHL's clambakes, bathing and boating – along with its location amongst the weekend homes of New York's best families – made the Bio Lab an attractive destination for those who attended its summer research camps.
Nothing, however, marks the historic intersection between the interests of donors and science more

sharply than the CSHL's infamous role as the center of eugenics in North America. Davenport was a leading advocate for social interventions to "improve" the American population, including sterilisation of the mentally-ill and policies against miscegenation and immigration. In 1910, he founded the Eugenics Records Office (ERO), of the Carnegie Institution's Station for Experimental Evolution, with sponsorship from Mary Williamson Harriman, the widow of a railway magnate. Harriman purchased a mid-Victorian timber residence nearby on seventy-five acres (thirty hectares) for the ERO and paid for a new masonry wing. The ERO soon enrolled far greater numbers of students than other courses. (Watson, 1991: 71). Harriman subsequently gifted a new brick building in the Second Renaissance Revival Style and USD300,000 to enable the Carnegie Institution to endow a Department of Genetics at Cold Spring Harbor (Figure 1). The BioLab, which had continued independently of the Carnegie Institution, came under the control of the newly-formed Long Island Biological Association (LIBA) in 1924. Its first President was investment

Fig. 1 - The former Carnegie Institution Building at CSHL. Photograph by S. Kaji-O'Grady.

banker Marshall Fields and its board members included luminaries of New York society, such as William K. Vanderbilt, Childs Frick, Louis Tiffany and Henry W. de Forest. Most of these LIBA directors had residences in the area. Well into the 1960s, a highlight of the annual Symposia was when 'speakers went to the homes of LIBA members for dinner parties that brought them together with prominent figures in the local community' (Watson, 1991: 169). Today the LIBA remains a non-profit organization that represents the "friends of the Laboratory".

In its *2017 Annual Report*, the CSHL reported that its revenue from public support and nonfederal grant awards was USD$84 million, while its revenue from Federal grants was USD$34.6 million (Cold Spring Harbor Laboratory, 2017a). Most of its research funding continues to come from private sources. To some considerable extent the research pursued today by its 600 scientists reflects the interests of individuals and philanthropic foundations. Research activities are focused on: the biology of human cancer; understanding neurological and neuropsychiatric disorders such as Alzheimer's disease, autism, schizophrenia and depression; plant development and genetics that impact crop productivity, biodiversity and the development of biofuels; genomics research in the areas of human genetics, functional genomics, small RNA biology and bioinformatics; and Quantitative Biology.

The relationship between donors and research subjects is perhaps best highlighted by Marilyn and Jim Simons, for whom the Simons Center for Quantitative Biology (SCQB) at CSHL is named. Marilyn Simons is on the board of Trustees for the CSHL and was Vice-President of the Board. Jim Simons first made his name for his research on pattern recognition and the development of string theory. He was a mathematics professor at Stony Brook University before setting up a hedge fund company called Renaissance Technologies, where he redirected his math skills to the stock market. As reported by *Forbes*, his net worth as of February 2018 is estimated to be $20 billion and he is the wealthiest individual on Long Island (Schachter, 2017). The Simons support basic science research across a range of areas that they argue are underfunded by the state (Lasker Foundation, 2016). They established the Simons Foundation Autism Research

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Initiative in 2003 and donated $11 million in 2005 to research in this field at CSHL.

The Simons have been instrumental in introducing their associates to the CSHL. Robert Lourie, another CSHL donor, was Head of Futures Research at Renaissance Technologies. He and his wife, Lisa, breed horses and live on the foreshore at Strong's Neck, 26 miles east of CSHL, in a Shingle-style house with gables and dormers. Of giving to local organizations and charities, Lisa Lourie advocates 'You have to tend your nest' (Stony Brook Foundation, no date). She is not alone in holding this conviction. The Simons retired to 26 acres at East Setauket, just east of Cold Spring Harbor (Virtual Globetrotting, 2018). Jamie Nicholls, who was elected Chairman of the Board in 2010, lives with her financier husband at Mill Neck, just three miles (five kilometers) from CSHL and once home to the Vanderbilts, Whitneys, Rockefellers, and Levitts (the developer of Levittown). Charles and Helen Dolan, who own Madison Square Gardens and founded Cablevision and HBO, funded the dormitories at CSHL. They live on the waterfront nearby at Oyster Bay next door to the singer Billy Joel (and where they famously sheltered golfer Tiger Woods in 2010). Mary Lindsay, for whom the child care center is named, lives with her lawyer husband in Laurel Hollow. Donald Everett Axinn, whose name adorns a wing of the Hillside Campus, lived on Long Island with his wife Joan, and was a member of the Sands Point Country Club and the Old Westbury Racquet Club. Donors Jo Ellen and Ira Hazan live at Sands Point.

What is remarkable about the CSHL are the relationships the laboratory has had with its local community of supporters for over a century.

Of course, other scientific institutions benefit from philanthropy and also use this money to build new research centers. The amounts gifted are extraordinary. Oil and gas producer Bob Belfer and his wife Renée, after whom the Belfer Research Building (2014) at Weill Cornell Medical College in New York is named, gave USD$100 million to its construction. Phil Knight, co-founder of Nike, gave his alma mater, the University of Oregon, $500million in 2016 to build an entire new campus for basic scientific research. Ray Dolby's estate gave the University of Cambridge 85 million pounds (US$112million) in 2017 to build new premises for the Cavendish Laboratory. What is remarkable about the CSHL, however, are the relationships the laboratory has had with its local community of supporters for over a century. CSHL's campaign video opens with a view of the campus from across the harbor and a voiceover that says, 'Right in your backyard, researchers at Cold Spring Harbor Laboratory are working tirelessly to find cures for cancer, autism and other diseases. Helping our neighbours on Long Island like Emma Larsen, born with MSA…' (Cold Spring Harbor Laboratory, 2017b) CSHL's donors identify with the organization as one of their own, much as they might their country club. The CSHL is more than a place associated with their philanthropic community, it is a microcosmic reflection of it. Much of its ongoing embrace by the local elite lies with Watson and his architectural predilections.

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James Watson, the Philanthropist's Friend
James Watson's association with the CSHL is a long one. In 1953, Watson and Crick made their first public presentation of the DNA double helix at the CSHL annual summer symposium. In 1968, six years after winning the medal for the Nobel Prize in Physiology or Medicine with Frick, Watson married Elizabeth Lewis and became the Laboratory's director. He was appointed the CSHL's President in 1994 and Chancellor ten years later. While his leadership style has been contentious and his statements about race have attracted disapprobation, his ability to garner funds is widely admired. Watson saved the CSHL from ruin in the 1970s with a decidedly personal approach to fund-raising that built on the laboratory's traditional local constituents and his singular reputation. Even his 90th birthday party in April, 2018 was a benefit, raising over $750,000 towards an endowed professorship at the laboratory.

Watson has, accurately, argued that 'research institutions must have rich neighbors nearby who are inclined to take pride in local accomplishments' (Watson, 2007: 313). This is particular so for an institution that lacks proud alumni nor grateful patients. He has also claimed that as a manager of a scientific research institution, 'You have to like people who have money. I really like rich people' (Strickland, 1993).

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By his Board member's standards, Watson himself is not rich. According to the CSHL's Schedule O, Form 990-PS submission to the Internal Revenue Service in 2012, Watson's salary as its Chancellor Emeritus was US$384,238. According to *Forbes*, in 2017 Biondi, husband of the Chair of CSHL's Board, is worth US$1.6 billion, while James Simons is reported to be worth $18 billion. Louis Moore Bacon, one of CSHL's most generous donors and another local resident, is reputedly worth US$1.8 billion. Bacon and Biondi each earn more annually than the entire annual payroll of CSHL's 1,256 employees, while Simons could purchase the entire site and its operations. The gap doesn't matter, for Watson intuitively understands Bourdieu's distinction between money and milieu. Watson has made every effort to maintain social continuity between the local elite and the Laboratory's scientists, insisting that 'entering worlds where your trustees relax – joining their clubs or vacationing where they go with their families in the summer, for instance – is a good way to put relations on a social footing. Seeing you as more friend than suppliant will incline them to go the extra distance for you in a pinch' (Watson, 2007: 313).

The Architecture of the CSHL

Watson also recognizes the value of architectural choices in reiterating social and lifestyle continuities between the scientists and the local residents. The commissioning of new buildings in a range of nostalgic, historically-inspired styles, is a critical component of his social climbing. Watson engaged Moore Grover Harper – one of the many professional configurations and practices established by architect Charles Moore over his long career – over four decades ago. CSHL has remained loyal to the firm, now known as Centerbrook Architects and Planners. Centerbrook are housed in an historic compound of nineteenth century mill buildings in Connecticut and claim to be committed to 'enduring aesthetics' and to specialize in 'American place-making and the craft of building.' (Centerbrook, 2018) Their residential work is almost entirely reworkings of historic and vernacular styles, while their institutional and educational projects are more diverse. For other science organizations, such as the Jackson Laboratory for Genomic Medicine (2014), they employ contemporary curtain wall glazing and bold, modernist forms.

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Centerbrook's designs for new buildings and alterations on the CSHL campus labor to conceal their purpose and youth. Indeed, modernist buildings constructed before the arrival of Watson, such as the concrete Demerec Laboratory of 1953, have been camouflaged with ivy and hidden behind unsympathetic additions. Their design for the Computational Neuroscience Laboratory (2009) is clad in timber siding in random widths to recall the cabins it replaced and is roofed in copper foil shingles. The Beckman Laboratory (1981) tries to conceal its size as well as age, through 'its dark brick exterior' and 'extra large windows that make it appear smaller when viewed from a great distance' (Watson, 1991: 315). Elizabeth Watson optimistically proposes that 'it could be mistaken for a grand waterview-endowed Long Island mansion design in classical turn-of-the-century-style' (Watson, 1991: 315). (This is not so, even its architects consider its bulk and siting a mistake). Centerbrook's second home for the Watsons is in the English Regency style, painted a peach color and featuring symmetry, chimneys and traditional double hung windows. Built in 1994, and pretentiously christened Oaks at Ballybung, Elizabeth Watson describes the house as being 'inspired by the classic farmhouses outside Venice designed in the late sixteenth century by the Italian architect and author Andrea Palladio' (Watson, 2008: 127).

The first major expansion of the infrastructure of the CSHL took place in 2009 with the opening of the 100,000 square foot Hillside Laboratories at a construction cost of USD$100 million. Eighty percent of the capital came from private donors and philanthropic foundations whose gifts are commemorated in building names – the Donald Everett Axinn Laboratory, the Nancy and Frederick DeMatteis Laboratory, the David H. Koch Laboratory, the William and Marjorie Matheson Laboratory, the Leslie and Jean Quick Laboratory, the Wendt Family Laboratory. Even the complex's heat exhaust vent bears the name of donors and is pretentiously called the Laurie and Leo Guthuart Discovery Tower.

Housing about one-third of its research personnel, the new laboratories are below ground and have no natural light or outlook. Approximately 200,000 cubic yards of earth was removed and 11 acres of forest cleared, to enable the laboratories to be buried (CSHL, 2009). As the drawings below (Figure 3a and 3b) show, the subterranean laboratory floor is a single interconnected structure, but the connections are awkward and circulation routes labyrinthine. The fragmented plan required no fewer than five elevators and six stairwells to address fire and accessibility codes. The laboratories themselves are small and insular. As research teams grow and shrink, there is no ability to simply change the allocation of benchspace as there would be in a larger laboratory. Indeed, the compromised functionality of these laboratories underscores the rhetorical priorities of the CSHL's architecture.

Above ground the Hillside Laboratories emerges as six discrete buildings. The CSHL proposes that these 'complement rather than overpower the CSHL's smaller, historic buildings', but they, are in fact considerably larger and their construction – a brick base with concrete and concrete block superstructure – yields none of the finer detailing of early twentieth-century timber methods CSHL, 2009). Clustered around a multi-level courtyard (Figure 3a) each is painted a different color – sienna, sage, olive, umber, yellow ochre. The roofs are steeply pitched and the gables at each end are punctuated by vertical 'chimneys' that conceal the necessary vents and risers of the hidden laboratories (Figure 3b). Randal Jones, the campus manager, in an email to this author explains the design 'was intended to recall an alpine village. This is enhanced by the severely sloping site, the use of artificial pavers in the courtyard spaces, and a towering central exhaust stack mimicking a church bell tower common to village squares.' In a series of negations, Bill Grover of Centerbrook suggests '[w]e didn't want to build something that would make it no longer look like a small whaling village' (Tarquinio, 2009). His colleague, Jim Childress, believes the buildings of CSHL 'do not look new or even like laboratories' (Childress, 2015). He adds, 'it's not obvious, even from close up, what goes on at Cold Spring Harbor Laboratory" (Childress, 2015). In 2009, a reviewer for the *New York Times* suggested '[a]n architectural sleight of hand has disguised the new labs as a miniature Bavarian hilltop village' (Tarquinio, 2009).

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It would be inaccurate to identify the Hillside Campus as a postmodern building The retrogressive architecture that we see at CSHL commenced before and has persisted long after the revival of historical styles

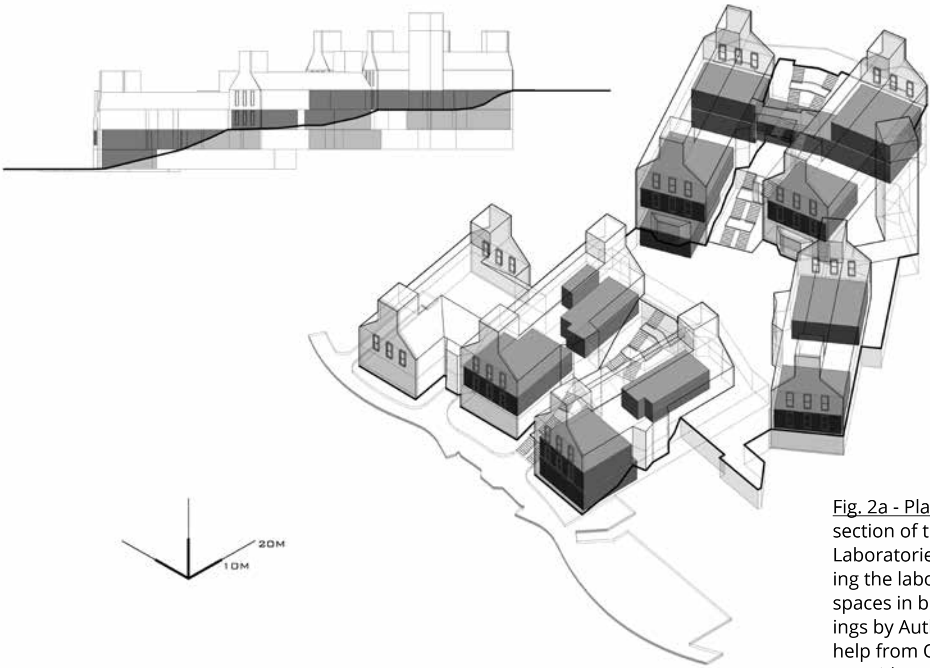

Fig. 2a - Plan and section of the Hillside Laboratories, showing the laboratories spaces in blue. Drawings by Author with help from Quoc Anh Ho, Aiden Morris and Carlotta Marijuan-Rodriguez.

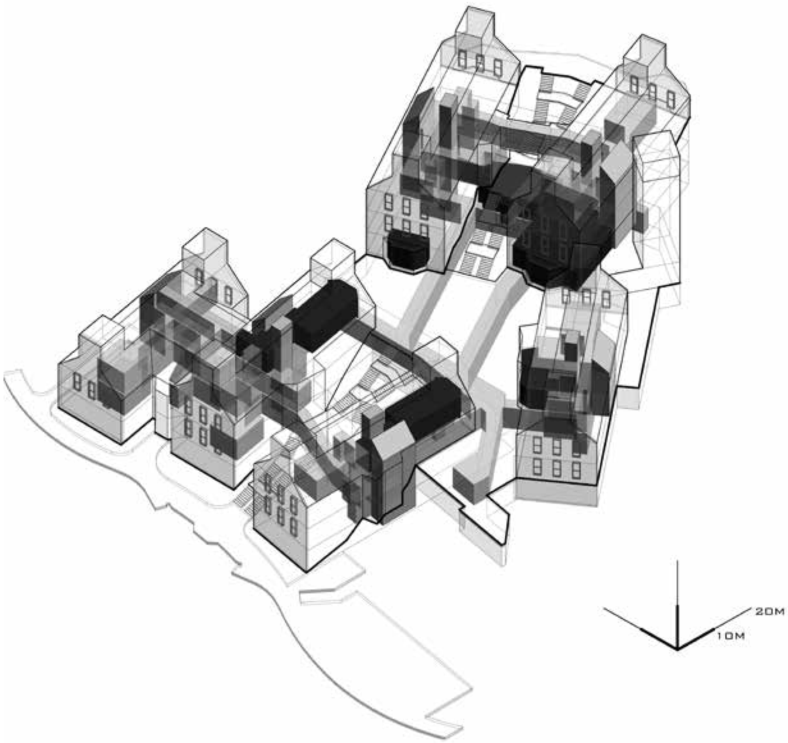

Fig. 2b - Circulation diagram of the Hillside Laboratories. Drawings by Author with help from Quoc Anh Ho, Aiden Morris and Carlotta Marijuan-Rodriguez.

Figs. 3a and 3b - The Hillside Campus at the CSHL from above and below. Photographs by S. Kaji-O'Grady.

in the 1980s. Between the 1890s and 1940s, the elite families of the region built over one thousand mansions in neo-Georgian, English Tudor, Gothic, Roman and French chateau styles (and combinations thereof) in emulation of the country estates of the European aristocracy. Some of these houses were transplanted to the campus after Watson's arrival, where they now find themselves bordering invented 'historic' streets. Today's conservative elites in the region – the milieu of CSHL's donors – live in original or reproduction versions of these early mansions. They employ architects such as Robert Stern, Shope Reno Wharton, and Haynes-Roberts, to deliver houses that look traditional, but incorporate contemporary technologies for construction, heating and cooling, security, and communications. Centerbrook provide a similar service to the CSHL.

With the architects' cooperation and expertise, the Watsons have overseen the development of the campus towards the creation of a pseudo-historic architectural ensemble that is idiosyncratic in the field of biosciences research. It is also at odds with the CSHL's forward-looking research and young work force – the ratio of senior to junior members of scientific staff is roughly 2 to 3 compared with 7 to 3 at the Salk Institute (CSHL, 2017). Despite housing up-to-date technologies and boasting a Fellows program to support young early career scientists, the CSHL reproduces a version of the residential villages around it. It is 'like a New England town square' (Childress, 2010). Through the architecture of the CSHL a philanthropic base is constructed and reified, a scientific agenda forged and favored, and the excesses of the capitalist economy modulated in maintenance of the status quo. Here scientists and philanthropists each find succor.

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J. Craig Venter and the West Coast scene

James Watson collects art, plays tennis, drives his Jaguar XJL around the North Shore's country roads, and dons black tie for fund-raising galas and dinners with New York's elite financiers and philanthropists. His wife, Elizabeth, a graduate from the private liberal arts women's college, Radcliffe, hosts dinners and receptions in the house at CSHL and sits on numerous boards for museums, botanic gardens, and historic preservation. (Watson, 2008: 208). Craig Venter's leisure pursuits, on the other hand, are of a different shade and the popular press has eagerly followed the exploits of this former surfer, navy veteran, and single parent. As told by (or to) *The New York Times*, these include 'riding his German motorcycle through the California mountains, cutting the inside corners so close that his kneepads skim the pavement' and 'snorkeling naked in the Sargasso Sea surrounded by Portuguese men-of-war' (Hylton, 2012). *The Wall Street Journal* reports that in addition to owning a 'gas-guzzling' Range Rover, Aston Martin, and having a penchant for rare vintage motorcycles, Venter enjoys 'doing large donuts' in his '45-foot jet boat' (Lin, 2014). Venter's third and current wife is his publicist Heather Kowalski, which may, in part, explain why he is accused of 'science by press release' (Singhal, 2013). Science historian Steven Shapin describes Venter as 'aggressive, arrogant and ruthlessly competitive' as well as 'belligerent, innovative, ambitious and entrepreneurial' (Shapin, 2015).

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Where Watson's affiliation with CSHL has been steady, Venter's business activities and collaborations are dynamic and complex. One of Venter's trailblazing contributions to science has been the design of a business model that twins non-profit basic research organizations with for-profit companies. The model aims at a swift transition of scientific discoveries into marketable products for companies, which in turn make tax-deductible gifts to their not-for-profit partners to fuel further research. The J. Craig Venter Science Foundation was launched in April 2002, merging three of the five not-for-profit research companies Venter had previously established. He personally gave the foundation a USD100-million-plus endowment that he had amassed from a previous venture, Celera – a curious case of being both philanthropist and beneficiary. In 2005, Venter launched a for-profit company called Synthetic Genomics which funds 8% of the JCVI's roughly 300 researchers and has rights to the intellectual property generated by their research activities. Venter owns 15%.

Venter also sought venture capital for the research being undertaken by Synthetic Genomics and its subsidiaries, which now includes a fourth one formed in 2014 called Human Longevity Inc. (HLI). Venture capital is not philanthropy, for investors seek an agreement with the companies they invest in to share equity and future profits. Yet it bears some of the same social characteristics and tax benefits. Investing in research where there is very little chance of making a profit in the short to middle term is a way for corporation to redirect excess money while appearing to make a commitment to discovery. The US$300 million that Exxon gave Synthetic Genomics in 2009 to develop algal biofuels is a good example of this. Their gift was not taxed since there has been no profits or capital gains. Commentary since has emphasized the failure of the venture to yield viable algal biofuels and questioned the sanity of and motivations for Exxon's ongoing commitment. Yet more is at stake for the petroleum giant than finding alternative fuels, the apparent end goal. Indeed, Exxon has its own research subsidiary, Exxon Enterprises, and in parallel invested the same amount on in-house research into algal biofuels. What the company sought from its alliance with Venter, was not so much a recipe for biofuels, as his reputation for innovation, for intellectual originality, and daring-do. They aimed at what in marketing is called 'brand alliance'. They also sought green credentials. The same applies for Monsanto and Novartis, to name just two of the larger equity investors in Synthetic Genomics' subsidiaries. Architecture helped in this regard.

The Architecture of the JCVI

JCVI is the respectable and visible center of this complex network of business and research activities. Their three-story headquarters of the JCVI in La Jolla, California opened in 2013 and was designed by Zimmer Gunsul Frasca (ZGF) at a construction cost of USD forty-eight million (Figure 4). It comprises a laboratory and administration facility of 45,000 square feet (4180 square metres) on a 1.75 acre (0.7 hectare) scenic coastal site at the Scripps Upper Mesa. The land was gifted for a peppercorn lease by Venter's alma mater, the University of California, San Diego. The architectural expression of Venter's new laboratory speaks volumes about the paradoxical agenda of Venter's quest to save the world through synthetic genomics. Venter's ambitions for the building were twofold: to emulate the Salk Institute of Biological Studies which lies three kilometers to the north; and

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to inspire other laboratories to reduce their environmental impact. Accordingly, the design by ZGF, borrows the raw teak and exposed concrete of the Salk Institute, and has a central courtyard open at one end to views of the sea. But where Louis Kahn's design for the Salk foregrounded the offices of the lead scientists, it did so in a way that suggested their democratic engagement as a collective, with each office of equal-size and prominence. Venter's office at the JCVI, on the other hand, is singularly large and, at the prow of the administration and facilities wing. It is the only office with ocean views. The JCVI's courtyard is long and narrow, its flanking wings asymmetrical. Overhead a roof of photovoltaic panels obscures the sky above the courtyard while Venter's office obscures views to the sea. The building and its grounds fail to cohere into any single architectural iconic image, but the centrality of Venter to the organization is unmissable. He is to the JCVI what a king is to a palace.

Venter and his architects aimed to achieve a net-zero energy laboratory building through orientation, sunshades, high-performance glazing, operable windows, and a naturally ventilated car park with bicycle storage. Unused equipment is automatically shut-off and there are variable brightness settings

Fig. 4 - The JCVI building in La Jolla, California from the South. Photograph by S. Kaji-O'Grady.

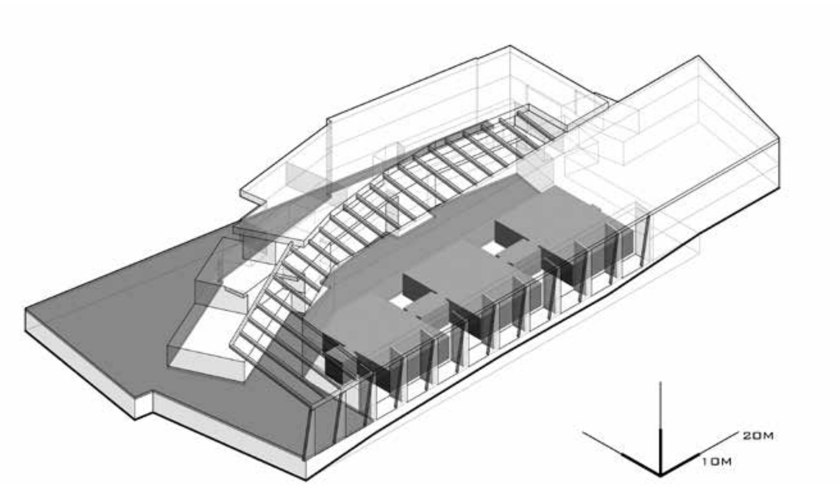

Fig. 5a - Diagram of the JCVI showing the laboratories in blue. Drawing by Author with help from Quoc Anh Ho, Aiden Morris and Carlotta Marijuan-Rodriguez.

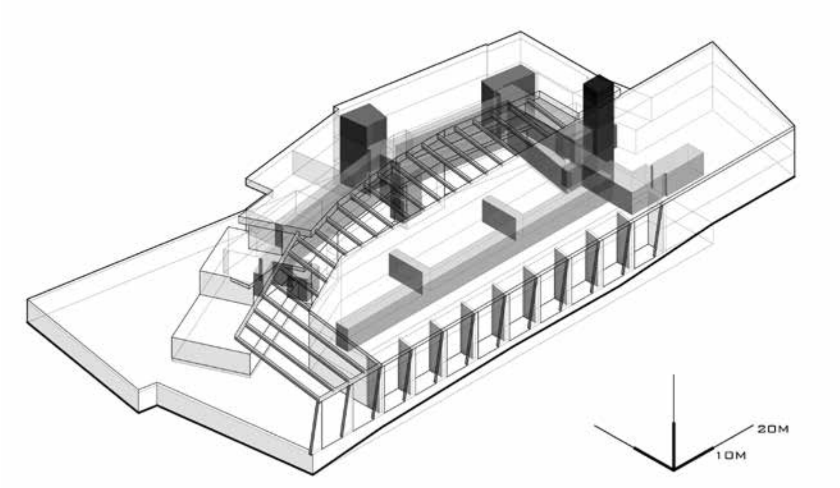

Fig. 5b - Diagram of the JCVI showing the circulation routes bifurcating from the entry to the laboratories in one wing, and Venter's office at the end of the other wing. Drawing by Author with help from Quoc Anh Ho, Aiden Morris and Carlotta Marijuan-Rodriguez.

for artificial lighting. Additionally, the building has chilled beam air-cooling, recycled water for non-potable water functions, low water landscaping, rainwater collection, and high-efficiency plumbing fixtures. Materials with low-embodied energy were specified – high-strength concrete with a maximum amount of recycled content, bamboo flooring and Spanish cedar timber siding. The most visible sustainable feature of the laboratory is the mass of integrated photovoltaic panels – two arrays comprising 26124 SF of photovoltaic surface – that the architects predict will exceed the building demand. Given the huge power demands of laboratories, this is an impressive feat. To achieve sufficient area, the array covers the roofs of both wings and the courtyard between them. A planned bio-reactor succumbed to budget revisions in the design documentation phase.

For Venter, '[t]he Institute's unique design melds the environmental philosophies of our genomics research with […] sustainability goals' (ZGF Architects LLP, 2015: 7). In fact, Venter has elsewhere described the mechanical approach to sustainability as limited, explaining that he 'wanted to do more than just using less oil and gas or installing a solar panel' (Venter, 2007: 334). Ironically, he has 1488 of them at the JCVI and more at home. By contrast, Venter's for-profit organizations reside in air-conditioned leased accommodation, the architecture of which is oblivious to even the simplest fuel-reduction strategy. Without diminishing the fuel savings made at the JCVI or its role as a model, Venter arguably needs solar panels symbolically more than needs to offset his fuel costs. His research has a rhetorical dependency on recognition of human-caused environmental degradation. Venter's research program into synthetic genomics requires problems that synthetic genomics specifically will solve. Thus, Venter declares that 'modern life, in short, is unsustainable', and so as to propose 'environmental genomics' is the answer (Venter, 2007: 334). Self-replicating synthetic genomics and microbes have many potential uses – only one of which is the engineering or bioremediation of the earth's 'sick atmosphere' (Venter, 2007: 348). In short, the design of the JCVI reinforces climate change as a problem to be solved by advances in science, engineering and technology, rather than, say, behavior change, population reduction, or social revolution. Companies like Exxon get green credentials for giving money to Venter to research bio fuels derived from algae, Venter gets green credentials from his building. It is worth noting that the Hillside Campus Laboratories at CSHL likewise incorporates energy-efficiency and sustainability measures, such as a highly insulated building envelope, but these are invisible.

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Venter and his Backers

So, how does the representation of environmental commitment work in tandem with the building's emphatic staging of Venter as its Chairman and chief scientist, and to whom is the building addressed?

If we return to the companies and individuals that support the JCVI's research and that of its commercial arms, it becomes clear that the building, right down to the vintage motorcycles that decorate Venter's office, (Figure 6a) speaks to the predilections of those who see a kindred spirit in Venter's adventurous approach to life, science, and entrepreneurship. Take, for example, his cofounders in Human Longevity Inc, Dr. Robert Hariri and Dr. Peter Diamandis. Like Venter, these are high-achieving entrepreneurs who combine scientific knowledge and business acumen. Hariri, is a celebrated surgeon and biomedical scientist, and also a member of the board of trustees of the JCVI. Hariri's company, Lifebank USA, a placental and cord blood banking business, was acquired by HLI in January, 2016. Diamandis has degrees in Molecular Genetics and Aerospace Engineering from MIT, as well as an MD from Harvard Medical School. Founder of the X Prize Foundation, known for its USD$10 million Ansari X Prize for private spaceflight, Diamandis is also co-founder of the Singularity University, and a company called Planetary Resources that hopes to mine asteroids for precious metals.

People like Hariri and Diamandis take risks. Larger corporate investors, such as Exxon Mobil, BP, Novartis, and Monsanto, can easily afford to take calculated (tax avoiding) risks. Venter's goal 'is to replace the entire petrochemical industry' (Pollack, 2010), but what they heed is his claim that '[w]hoever produces abundant biofuels could end up making more than just big bucks – they will make history… The companies, the

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Fig. 6a. One of Venter's Vintage motorcycles in his office. Photograph by S. Kaji-O'Grady.

Fig. 6b - Walls of certificates and medals in Venter's office. Photograph by S. Kaji-O'Grady.

countries, that succeed in this will be the economic winners of the next age to the same extent that the oil-rich nations are today' (Wenner, 2009). The CEOs and agents of these companies are reassured by the scale and location of the JCVI and by Venter's large office with its walls covered with the medals and certificates that declare his standing in the scientific community (Figure 6b). The universities, government organizations, investors and other private corporations that circle around the star presence of Venter and his team are a complex constellation critical to the formation and operation of the new JCVI building. Equally, the building provides the critical gravitational pull that keeps them circling. Its blend of technical innovation, moral high ground, and homage to the Salk, speaks to Venter's aphorism that, '[i]f the science works, the business works, and vice versa' (Pollack, 2010).

Conclusion

This paper opened with the argument – made by others – that the scientific research landscape is distorted by its increasing reliance on private funding. It is equally arguable that the architecture of science is similarly being shaped by this context. If we ask whether a partnership like that of Jonas Salk and Louis Kahn could play out in La Jolla today, the answer would have to be that it is unlikely. Craig Venter, like

Salk, had the rare opportunity of commissioning a purpose built institutional setting in his name, while still alive. An obvious choice of architect, someone with similar background and interests, would have been Thom Mayne – another Californian born in the mid-1940s who sought out the unconventional. A partnership with Mayne's Morphosis is not what happened though for Venter needs his corporate donors. The architecture needed to lend gravitas to the scientist, to make it clear that he'd grown up and could, would, save the world.
Centrebrook and Zimmer Gunsul Frasca are competent, client-focused, commercial practices untroubled by the formal ambitions and theoretical rhetoric that has seen architects such as Fosters, Tadao Ando, Zaha Hadid, Chipperfield, SANAA – each of whom have designed laboratory buildings in the last decade – come to prominence. Which is not to say that the architecture of the JCVI and the CSHL Hillside campus is indifferent, accidental, or without interest. These buildings house exceptional researchers and their laboratories in similar scientific fields in the same nation, but the architecture of each has its roots in forces outside of the expression of the laboratory function or the scientific program. The CSHL pursues a retro-village aesthetic while the JCVI opts for a Kahn-ian inflected display of sustainable technologies. Their incommensurate architectural clothing is both fascinating and revealing. This paper has sought to understand their divergence. It has argued that the differences between them arise because each is exceptionally attuned to the taste cultures and concerns of the people on whom the researchers depend to fund their endeavours. It's a sensitivity that is repeated across the sector, wherever there is need to target the interests and preferences of old or new money, philanthropy or speculative investors.

The differences between them arise because each is exceptionally attuned to the taste cultures and concerns of the people on whom the researchers depend to fund their endeavours.

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