Living Bricks of Venice:
Vision, prototype, exhibition

Event Timetable
Programma Evento

10:30 - 11:00	**Registration** *Registrazione*	Coffee & biscuits *Caffè e biscotti*
11:00 - 11:15	**Rachel Armstrong**	LA Introduction *Introduzione a LA*
11:15 - 11:30	**Round table of experts** *Tavola rotonda di esperti*	Ioannis Ieropoulos, Juan Nogales, Rolf Hughes and Massimo Lepore
11:30 - 12:30	**Press Q & A** *Spazio riservato alle domande della stampa*	Floor open to questions with contributions from the floor with all LA members *Domande con contributi da parte di tutti i membri del consorzio LA*
12:30 - 14:30	**Exhibition** *Esposizione*	Living bricks and lunch *Mattoni viventi e pranzo*

The LA Project (April 2016-2019)

Il progetto LA (Aprile 2016-2019)

The €3.2m Living Architecture (LA) scheme is a next-generation, selectively-programmable bioreactor. It includes experts from the universities of Newcastle (England), the West of England (England) and Trento (Italy), in collaboration with the Spanish National Research Council (Spain), LIQUIFER Systems Group (Austria) and EXPLORA Biotech (Italy). The technology is envisioned to function as an integral component of human dwelling, capable of extracting valuable resources from sunlight, waste water and air and in turn, generating oxygen, proteins and biomass through the manipulation of their interactions.

The goal of project LA is to design and build a proof-of-concept "living architecture" whose targeted breakthrough is to transform our habitats from inert spaces into programmable sites. LA will be developed as a modular bioreactor-wall, based on the operational principles of microbial fuel cell technology and synthetic "consortia" of microbes. Specifically it aims to extract resources from sunlight, wastewater and air. The bricks are able to fit together and create "bioreactor walls" which could then be incorporated in housing, public buildings and office spaces. The "building blocks" are conceived as standardized building modules that can be incorporated into common building construction methods.

Each bioreactor "building block" has a programmed and configured Microbial Fuel Cell (MFC), which typically converts chemical energy of an organic feedstock into electricity, via the metabolic processes of microorganisms, which act as biocatalysts for organic processes such as purifying grey water.

The economic value models used to justify this approach are based in both notions of "circular economy" - in functionally retrofitting our living spaces with improved performance criteria such as making electricity from organic sludge - and finding new ways to power our homes and cities.

The project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement no 686585.

Website: **http://livingarchitecture-h2020.eu**

Living Architecture (LA) è un progetto da 3.2 milioni di euro per la realizzazione di un bioreattore di nuova generazione e selettivamente programmabile. Il progetto include esperti delle università di Newcastle (Inghilterra), dell'Ovest dell'Inghilterra (Inghilterra) e di Trento (Italia), in collaborazione con il Consiglio Nazionale di Ricerca di Madrid (Spagna), LIQUIFER Systems Group (Austria) ed EXPLORA Biotech (Italia). Il progetto prevede una tecnologia che potrà funzionare come parte integrante dell'abitare umano, capace di estrarre preziose risorse dai raggi solari, dall'aria e dalle acque di scarico e, a sua volta, di generare ossigeno, proteine e biomassa attraverso la manipolazione delle loro interazioni.

Lo scopo di LA è quello di sviluppare e costruire, come progetto pilota, un'"architettura vivente" il cui impatto possa trasformare i nostri habitat da spazi inerti a luoghi programmabili. LA sarà sviluppato come un muro-bioreattore modulare, fondato sui principi operativi della tecnologia della pila a combustibile microbiologica e di "consorzi" sintetici di microbi. In particolare, il progetto si prefigge l'obiettivo di estrarre risorse dalla luce solare, da aria e acque di scarico. I mattoni si incastreranno gli uni agli altri creando muri-bioreattori che potrebbero essere incorporati in edifici residenziali, pubblici, o uffici. Queste unità di base sono concepite come moduli da costruzione standardizzati e facilmente incorporabili in metodologie costruttive di uso comune.

Ciascun bioreattore-modulo ha una pila a combustibile microbiologica (MFC), che tipicamente converte in elettricità l'energia chimica di una materia di base organica attraverso il metabolismo di microorganismi, che biocatalizzano processi organici come la purificazione delle acque grigie. I modelli economici utilizzati per questo approccio sono basati sulla nozione di "economia circolare" - la trasformazione di spazi abitabili per migliorarne la prestazione, con interventi che includono la produzione di elettricità attraverso fanghi organici - e sulla ricerca di nuovi modi per dare corrente alle nostre case e città.

Il progetto è supportato dal programma Horizon 2020 Research and Innovation dell'Unione Europea, con accordo di sovvenzione numero 686585.

Event Introduction
Introduzione evento

Rachel Armstrong

For more than a century the city of Venice has hosted an international festival (La Biennale di Venezia), which has become one of the world's most significant cultural institutions. It is now recognized as a showcase for new creative trends and embodies the forefront of artistic research. Over the last thirty years, the Architecture Exhibition has become an increasingly important aspect of the Biennale. First held in 1975, the architecture festival is held separately from the arts event running on alternate years. This 2016 Venice Architecture Biennale is themed "reporting from the front" and lasts from 28 May to 27 November.

In keeping with the contemporary theme and spirit of the biennale the LA consortium are holding a meeting to introduce the first prototypes of the project, which will be exhibited during this event. LA's "living bricks" are at the forefront of designing with "living architecture", where the built environment actually acquires some of the properties of living systems but is not necessarily given the status of being fully "alive". Specifically, living architectures may grow, respond to their surroundings, metabolize, or self-heal. They are able to do this not because they mimic natural functions, but because they are actually integrators of the organic processes that are conventionally barricaded outside the traditional boundaries of a building, which they directly integrate within their structure and functionality. The living bricks incorporate the microbial fuel cell, a technology that draws from the unique metabolic properties of biofilms, from which resources such as, electricity and clean water are drawn. They embody an active and real interface between the biological and mechanical realms integrating natural physiologies with designed metabolism and machine functions. Living bricks produce their own energy to conduct useful work as well as providing a site for harbouring their nonhuman microorganismal residents.

Per più di un secolo la città di Venezia ha ospitato un festival internazionale (La Biennale di Venezia), divenuto una delle istituzioni culturali più significative al mondo. È ora riconosciuta come una vetrina per nuove tendenze creative ed rappresenta l'avanguardia della ricerca artistica. Nell'arco degli ultimi trent'anni, la mostra internazionale di architettura ha ricoperto un ruolo sempre più importante. Tenutasi prima nel 1975, il festival di architettura si svolge separatamente dalla quello delle arti, ad anni alterni. La Biennale di Architettura del 2016 è sviluppata intorno al tema "Reporting from the Front" ed è aperta al pubblico dal 28 Maggio al 27 Novembre.

In linea con il tema e lo spirito di questa Biennale, il consorzio LA ha organizzato un incontro per presentare i primi prototipi del progetto, che saranno esibiti durante questo evento. I "mattoni viventi" di LA sono all'avanguardia della progettazione di "living architecture," in cui l'ambiente costruito adotta proprietà dei sistemi viventi, senza però raggiungere lo status di "viventi" a tutti gli effetti. Più precisamente, le architetture viventi possono crescere, rispondere ai loro dintorni, avere metabolismi e proprietà autoriparanti. Queste caratteristiche non derivano dall'imitazione di funzioni naturali, ma da processi biologici che, invece di essere esclusi dai limiti di un edificio, sono integrati direttamente nella sua struttura e funzionalità. I mattoni viventi incorporano una pila a combustibile microbiologica, una tecnologia che utilizza le proprietà metaboliche dei biofilm, da cui ricava risorse quali elettricità ed acqua pulita. I mattoni corrispondono ad un interfaccia attivo e reale tra gli ambiti biologico e meccanico, integrando fisiologie naturali con metabolismi ingegnerizzati e funzioni meccaniche. I mattoni viventi producono la propria energia, con cui condurre attività utili e generare un habitat in grado di nutrire i microorganismi non-umani che vi risiedono.

Vision
Visione

Rachel Armstrong

Living bricks are part of the story of an alternative future for the historic city, which owing to devastating changes in its relationship to rising water levels, is likely to be claimed by the sea. In 2008 we began to ask whether it was possible to turn Venice's fate around by equipping it with some of the properties of living things so that it may actively fight back against the elements in a struggle for survival similar to that of creatures, and so, adapt to changing conditions in ways that we'd normally associate with living systems.

Back in 2008 a model technology was explored as a possible platform for this transformation that was based on the chemistry and physical properties of dynamic droplets, with simple metabolisms. Potentially, such a system could initiate the construction of a protective limestone reef around the foundations of the city by biomineralizing Venice's wooden foundations, which are under threat by the traffic from large cruise ships whose wakes suck the preserving salt water out from under the foundations, leaving them exposed to the air, and susceptible to rot. With time, the bio concrete-stimulating droplets then would form a kind of protective kettle-limescale and even build up a residue that could repair the erosion of materials at the tidal zone in some specific locations.

Field studies to identify possible sites for testing the technology revealed that the natural marine wildlife was already carrying out a metabolically vigorous version of this process. This suggested that it might be possible to find ways of orchestrating a whole range of events between the biological systems in the lagoon, the chemical technology and the concrete-forming processes in the waterways to produce a synthetic platform, which was potentially programmable. We also looked at how natural biofilms could bind with waste plastic in the lagoon to create a new material and island for the city.

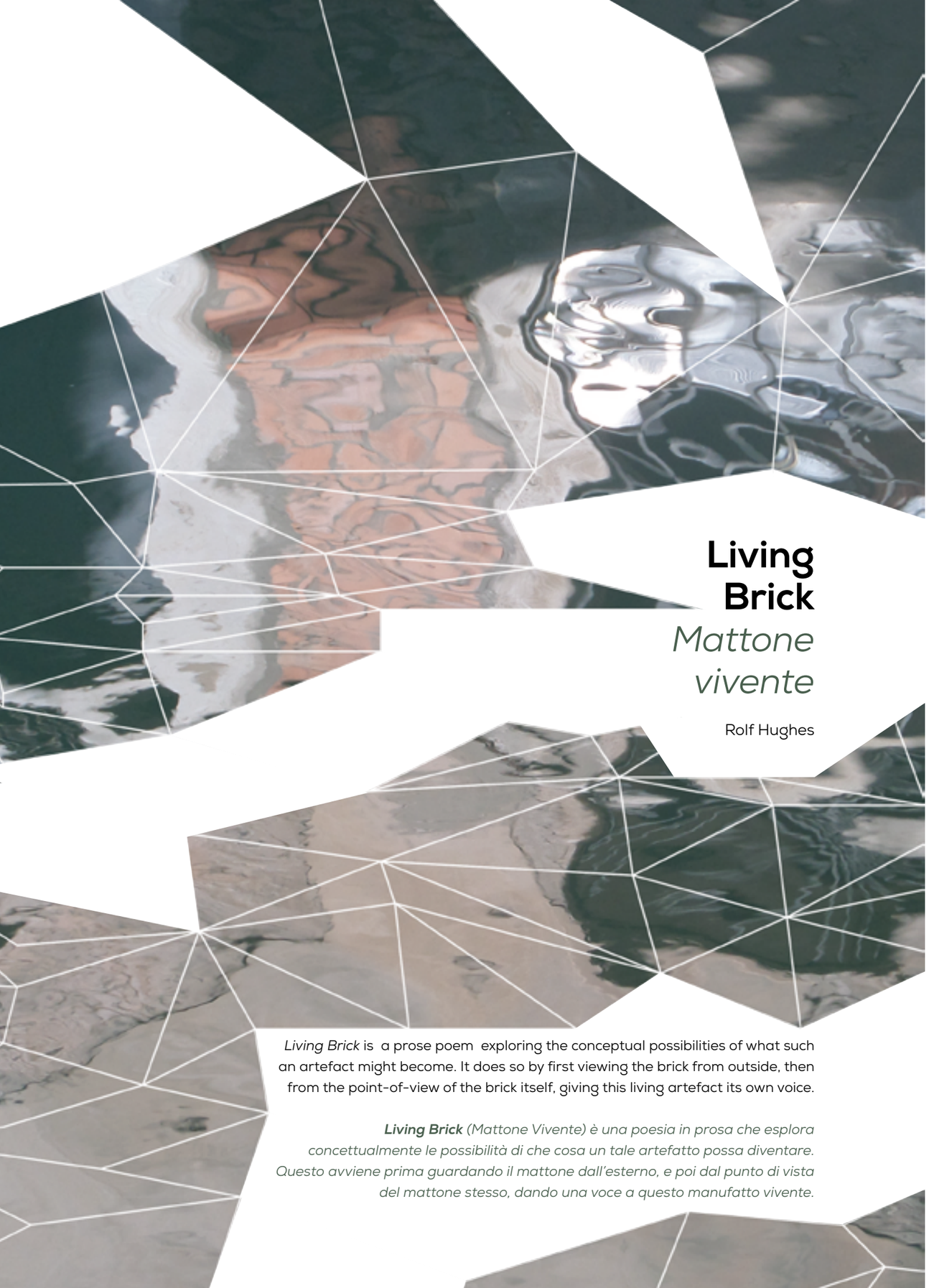
Living bricks are an exploration of that choreography, looking at how we might shape relationships between human habitation, technology and nature through a mutually beneficial relationship. While specific outcomes are not specifically directed towards the mineralization process at this stage, we are creating these prototypes so they can be directly interrogated by the Venice community, in the hope that they will explore their functions and help us understand how such apparatuses may be useful in addressing real challenges within a city that is being, quite literally, digested by its circumstances.

I mattoni viventi immaginano un futuro alternativo per la città storica, che a causa di cambiamenti devastanti nel rapporto con il crescente livello delle acque, rischia di essere riappropriata dal mare.
Nel 2008 cominciammo a chiederci se il destino di Venezia non potesse essere cambiato, munito di qualità con cui poter attivamente combattere gli elementi, in una lotta per la sopravvivenza simile a quella animale, e, così facendo, adattarsi a condizioni mutevoli secondo un modello che è normalmente associato agli esseri viventi.

Nel 2008, esplorammo come possibile punto di partenza per tali trasformazioni una tecnologia basata sulle proprietà chimiche e fisiche di liquidi dinamici con metabolismi semplici. Potenzialmente, un tale sistema potrebbe innescare la formazione di una scogliera calcarea che proteggerebbe le fondazioni della città, biomineralizzando i pali lignei di fondazione, che sono in pericolo a causa del traffico causato da grandi navi da crociera, le cui scie risucchiano l'acqua salata, lasciando i pali esposti all'aria e soggetti a putrefazione. Col passare del tempo, le gocce di bio-cemento formerebbero una sorta di pelle protettiva calcarea e rilascerebbero residui in grado di riparare la superficie erosa nelle fascie interessate dalle maree.

Sopralluoghi che avevano lo scopo di identificare possibili siti da sottoporre a test, rivelarono che la locale fauna marina era già impegnata in un vigoroso metabolismo, che nulla era se non una versione di tale processo. Questo suggerì la possibilità di orchestrare una serie di eventi che, integrando l'ecologia biologica della laguna con la tecnologia chimica da noi introdotta e i processi di cementizzazione dei corsi d'acqua, producessero una piattaforma sintetica programmabile. Studiammo inoltre come biofilm naturali potessero attaccarsi a rifiuti plastici nella laguna per creare un nuovo materiale e una nuova isola per la città.

I mattoni viventi sono un'esplorazione di tale coreografia, con l'intenzione di tessere relazioni mutualmente benefiche tra abitazione umana, tecnologia e natura. Anche se in questa fase la nostra ricerca non è diretta a processi di mineralizzazione, stiamo creando dei prototipi che possano essere direttamente investigati ed adottati dalle comunità di Venezia, con la speranza che ne esplorino le funzioni e che ci aiutino a capire come tali apparati possano incominciare a risolvere i problemi reali della città, mentre questa è progressivamente, e quasi



Living Brick

Mattone vivente

Rolf Hughes

Living Brick is a prose poem exploring the conceptual possibilities of what such an artefact might become. It does so by first viewing the brick from outside, then from the point-of-view of the brick itself, giving this living artefact its own voice.

Living Brick *(Mattone Vivente) è una poesia in prosa che esplora concettualmente le possibilità di che cosa un tale artefatto possa diventare. Questo avviene prima guardando il mattone dall'esterno, e poi dal punto di vista del mattone stesso, dando una voce a questo manufatto vivente.*

> An architect should live as little in cities as a painter. Send him to our hills, and let him study there what nature understands by a buttress, and what by a dome.
>
> John Ruskin, *The Stones of Venice*

It is not a being but an energy of translation, oscillating landscape, microbial city become covey of muscle, a throbbing hinge connecting worlds, or occult physiology channelling air, fire and water, plasma and flow. It makes a wall while subverting the logic of walls. A vibrant tomb, it has sealed its doors, membraned its windows – no one passes through alive, yet all are nourished. Domesticated minerals, dreaming of diamonds, channelling sweet, milky musk, dung's clammy mortar, pale, woody amber, galvanic crackle and spark. Press yourself against it and become architecture.

It is a truth universally acknowledged that we respond only when we are touched. After millennia of obscurity, we are now ready to assume form – to *trans*-form, enrich our soils, link spirals of the living and the dead. Plant us at the water's edge and we shine as brilliantly as reflected stars in this liquid cosmos. We start by building foundations, but we are instruments of social change; shape-changing acrobats, dancing aerialists, astronauts of the unknown – a community of vibrant, living constituents whose progeny will not be confined to earth.

Living Stones of Venice

Le pietre viventi di Venezia

Rachel Armstrong

The city of Venice sprung from the mud between the ninth and twelfth century, when the city-state of Venice was born. Using the latest technologies of the time, agrarian land drainage techniques made soft silts livable through digging canals, and opportunistic bridges sprung between islands to form twisted walkways, like briars. So, by networking about a hundred and eighteen islands together, the city accreted its present form through these structural weeds. Yet, when you walk through Venice looking for the story of its construction, you are encountering it the wrong way up.

La città di Venezia scaturì dal fango tra il nono e dodicesimo secolo, nel periodo in cui nacque l'omonima città stato. Utilizzando le più avanzate tecnologie del tempo, sistemi di drenaggio agricoli resero molli strati di limo abitabili attraverso lo scavo di canali e la formazione di opportunistici ponti tra le isole, dalla forma ritorta come pipe. È così che, connettendo circa centodiciotto isole l'una all'altra, la città crebbe fino alla sua forma presente; attraverso erbacce strutturali. Dunque, quando cammini attraverso Venezia alla ricerca della storia della sua costruzione, la incontri nel senso sbagliato.

The teetering city has maintained a tenuous skyline absent of vertical lines for over a millennium. It clutches the ground with its woodpile heels, just about staying upright by virtue of the enforced camaraderie of oblique buildings that lean on each other, with unlikely struts, pins and braces. This architectural uncertainty produces a rich tapestry of peculiar and ornate forms where spaces are linked from inside to outside with metal piercings, corseted to fall inwards, or pushed apart by brick piles at the apex of narrow walkways where roofs almost touch in triangular formation. At other points bridges subtend odd angles to negotiate the structural scrum between walkways, water and walls. While the city tilts and twists, the silt swallows the ground.

La barcollante città ha mantenuto una silhouette fragile e priva di verticalità per oltre un millennio. Si aggrappa al terreno con i suoi tacchi a spillo di legno, rimanendo a malapena in piedi grazie al cameratismo forzato tra edifici, che si appoggiano obliquamente gli uni agli altri, con insoliti pilastri, perni e controventature. Questa incertezza architettonica produce un ricco intreccio di forme decorate e peculiari. Qui gli spazi sono connessi dall'interno all'esterno con supporti metallici e corsetti. Pile di mattoni all'apice di sottili feritoie triangolari si toccano quasi in corrispondenza delle coperture. Altrove, ponti sottendono strani angoli per negoziare il miscuglio strutturale di passerelle, acqua e pareti. E mentre la città si inclina e ritorce, il limo ingoia il terreno.

And it is here that we find our first traces of living bricks, the creatures that steady the soft delta earths – calcareous algae, biofilm-producing microorganisms, barnacles, oysters, mussels and tenacious sabellariid worms. Venice is a creature of shoreline slurry – a glimmering mudfish. If you flip the city on its back you'll see the carefully constructed details of its organic underneath.

È qui che troviamo le prime tracce di mattoni viventi, le creature che stabilizzano le molli terre del delta – alghe calcaree, biofilm che producono microorganismi, lepadi, ostriche, mitili e i tenaci vermi sabellidi. Venezia è una creatura dei liquami litorali–un baluginante pesce da fango. Se ribaltassimo la città esponendone il dorso, vedremmo i dettagli costruiti dal suo paziente sottofondo organico.

They sift the lagoon's silty water for slime, grit, industrial waste, household effluents, marine condiments and countless garbage garnishes. They choose their building materials from these broths to form hardy bioconcretes that both bind the brickwork and chew on its bones so that – around its edges – Venice is constantly reinventing its boundaries, its lands and its communities through countless, unregulated, dynamic processes.

Setacciano l'acqua limosa della laguna alla ricerca di melme, pietrisco, rifiuti industriali, reflui domestici, condimenti marini ed innumerevoli contorni di immondizia. Selezionano i loro materiali da costruzione da queste brodaglie per formare robusti biocementi che legano tra loro le murature e ne masticano le ossa in maniera tale che, lungo il suo perimentro, Venezia reinventa costantemente le sue terre e comunità attraverso processi continui, irregolari e dinamici.

This is where Venice becomes interesting. Like all settlements, it is founded on rich soils that offer provision for its inhabitants, the founding communities being forced to seek the safety of extreme mud flats

È qui che Venezia diventa interessante. Come in ogni insediamento, essa sorge su terre ricche che offrono molto ai propri abitanti, le comunità fondatrici essendo forzate a cercare la salvezza delle paludi per sfuggire

to escape invasion. These ancient migrants had to find ways of adapting to the wetlands in ways that natural organisms are already able to.

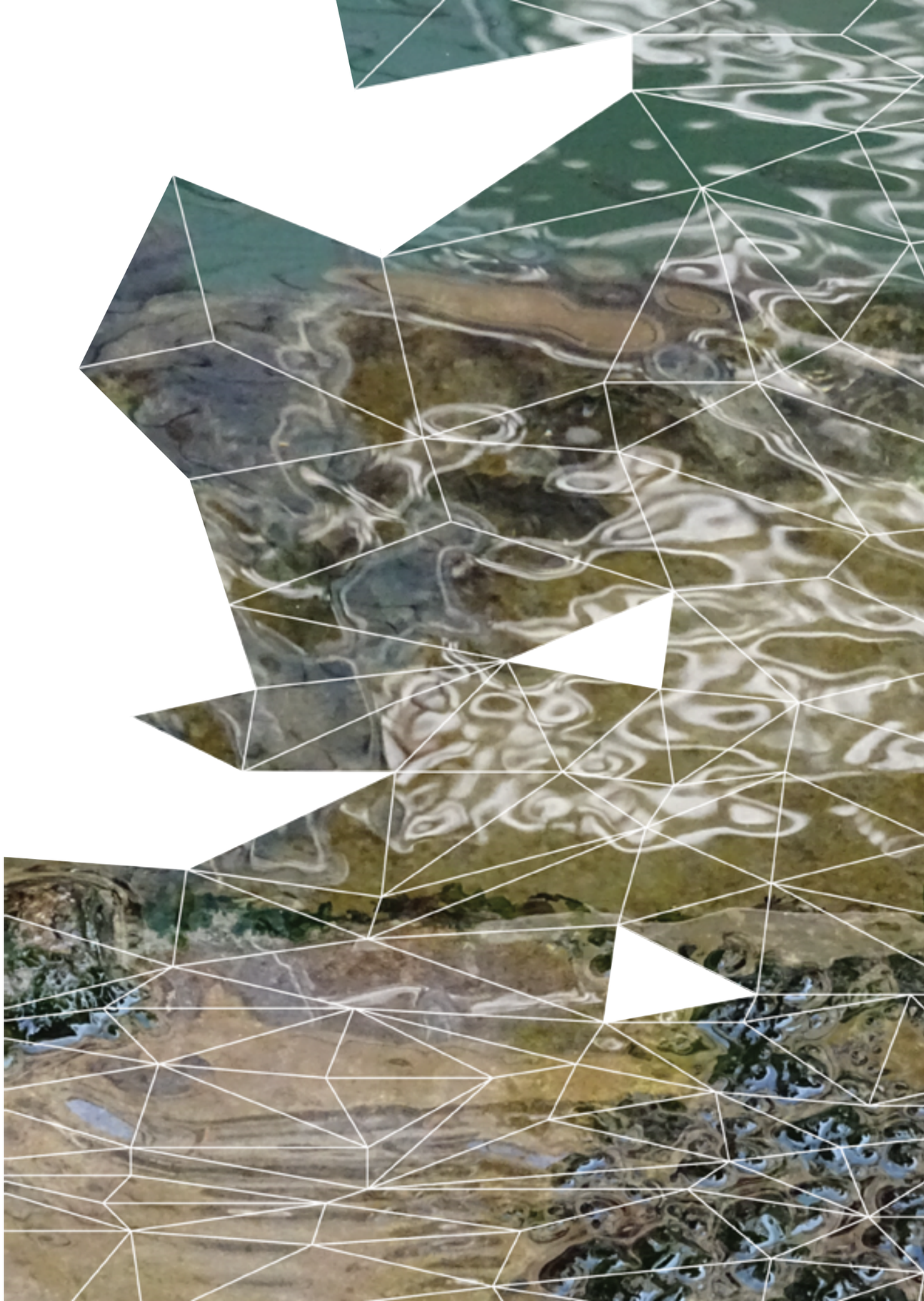
So, if you examine the city's underbelly alongside the palimpsests of agrarian technology that sought to drain and firm the silt, you'll also see evidence that the city's foundations are already "living" – nonhuman communities flourish alongside the human populations and become part of its founding stones and stories. These collectives of biofilms are inclusive, biodiverse sites that leak carbohydrate scaffolding into long threads of matter and clean the watery world around them, like a kidney. Gradually, these civilizations lay down living rocks that they harvest from the sediments in the lagoon. Seeking further modes of attachment in the waterways, they claw erosions in the buildings and gnaw at the foundations where they splay into sites of further decay. In these constantly shifting material fields, these communities are digesting and reshaping the city's boundaries, re-drawing territories and directing resources. Tirelessly these metabolic materials equip Venice with a living layer that enables it to negotiate its survival in an ongoing struggle against the shoreline elements – just as a creature does – navigating the impacts of waves, wind, tides, sunlight, desiccation and organic invasion. All the while these tiny cities are synthesizing their options through Venice's "living stones" (a reference to John Ruskin's architectural typologies), so that we're kept guessing about what this highly active structure might become.

The LA project provokes the possibility of how we may no longer be passive in our relationship with these spontaneous natural processes. It creates a context in which we may begin to "speak" chemically, physically, biologically, mechanically and even digitally (through electricity) with the living world. Of course, this ambition is aspirational but creates the conditions in which we might be able to see the possibility of a better and more symbiotic relationship between cities and the natural world - of an ethical, mutually beneficial, ongoing future for both humans and nonhumans alike.

ad invasioni nemiche. Questi antichi migranti dovettero trovare il modo di adattarsi a zone umide e lacustri nello stesso modo in cui già sanno farlo gli organismi naturali.

Infatti, esaminando il ventre della città lungo i palinsesti della tecnologia agraria che ne drenarono e compattarono il limo, troveremmo anche l'evidenza del fatto che le fondazioni sono gia' "viventi"– comunità non-umane prosperano parallelamente a popolazioni umane e diventano parte delle pietre e storie della fondazione di Venezia. Queste comunità di biofilm sono luoghi inclusivi e biodiversi che secretano impalcature di carboidrati in lunghi filamenti di materiale e ripuliscono l'acqua attorno a loro, come un rene. Gradualmente, queste civilizzazioni depositano le pietre viventi raccolte dai sedimenti lagunari. Cercando ulteriori modalità di ancoraggio in corrispondenza dei corsi d'acqua, graffiano erosioni negli edifici ed intaccano le fondazioni, e qui si estendono su siti di ulteriore degrado. In questi terreni di materia in movimento, tali comunità digeriscono e trasformano i limiti della città, ridisegnandone i confini e riorientandone le risorse. Senza sosta, questi materiali metabolici corredano Venezia di uno strato vivente che la rende capace di negoziare–come una creatura– la propria sopravvivenza nel presente conflitto contro i litorali, navigando l'impatto delle onde, del vento, delle maree, dei raggi solari, dell'essicazione e delle invasioni organiche. Nel frattempo queste mini città sintetizzano le proprie opportunità attraverso le "pietre viventi" di Venezia (un riferimento alle tipologie architettoniche di John Ruskin), in maniera tale che continuiamo a chiederci cosa questa struttura altamente attiva sia in grado di diventare.

LA evoca la possibilità di non rimanere più passivi nel nostro rapporto con questi processi naturali spontanei. Il progetto costruisce un contesto all'interno del quale poter incominciare a "parlare" chimicamente, fisicamente, biologicamente, meccanicamente ed anche digitalmente (attraverso elettricità) con il mondo organico. Certamente, questa ambizione serve da ispirazione ma crea anche le condizioni per contemplare la possibilità di un migliore e più simbiotico rapporto tra città e mondo naturale - di un future etico e mutualmente benefico tra esseri umani e non-umani.



Expanded Research Practices through Living Architecture

Pratiche di ricerca estese attraverso Living Architecture

Rolf Hughes

Expanded Research Practices Through Living Architecture celebrates the transdisciplinary research methods adopted by LA as a rich experimental condition for syntheses that draw together researchers and communities through shared interests and common goals. In doing so, the project makes possible the articulation of "experiences that resist easy reduction and instead invoke feelings, memories, aspirations and passions that evade resolution and reside within the terrains of poetry, magic and monsters, creating a rich platform for new kinds of juxtapositions, synthesis – and insight."

Pratiche di ricerca estese attraverso Living Architecture *celebra le metodologie transdisciplinari di ricerca adottate da LA in quanto ricca condizione sperimentale per sintesi che fanno convergere ricercatori e comunità attorno ad interessi ed obiettivi comuni. Così facendo, il progetto rende possibile l'articolazione di "esperienze che resistono una facile riduzione ed evocano invece sentimenti, ricordi, aspirazioni e passioni che eludono risoluzioni e risiedono nel campi della poesia, della magia e dei mostri, creando una densa piattaforma per nuovi tipi di giustapposizioni, sintesi - ed intuizioni."*

The LA project explores an extended conception of design by bringing together the sciences, design disciplines and the arts to investigate the possibilities of living, in the broadest sense of the term, in the 3rd millennium. The ambition and potential impact of this project therefore exceed the expectations and limitations of any one of its constituent disciplines by extending into unknowing and the realms of trust, partnership, community and collaboration upon which all cities are founded. One day Venice may be seen as the first truly living city.

As artistic research is about the integration of new research methods, artefacts, performances, and encounters, the contribution of *storytelling* as *transdisciplinary synthesis* becomes key not only to developing the scope of artistic research itself, but also its capacity to link and connect forms of expertise hitherto kept apart. The replacement of Enlightenment metaphors and analogies with those from the emerging ecological era will be central to bringing about a change in perspective that the project seeks. For if the Enlightenment laboratory has been the instigator of our linguistic limits in its preferences for Platonic truths, determinism and certitudes, it may also provide us with the means to develop alternative - if not radical - knowledge structures, value systems and cultural impacts. Instead of rational, sterile, highly controlled centres of knowledge that characterise the modem laboratory, we propose a counterpoint - 'messy', highly-distributed laboratories that work against the reductionism of pristine environments and that may expand our capacities to innovate and produce alternative story forms that resist centralised order. Such stories can facilitate hitherto impossible encounters that 'enliven' our capacity for disruptive, innovative inquiry that, in turn, sustains and enriches our knowledge of an ecologically stressed planet. Such (artistic) research methods imply a need for new evaluative criteria. The challenge of articulating criteria that both speak to established notions of research *quality* while yet respecting the specific characteristics of each disciplinary contribution will accordingly be a core consideration of the project as it develops.

At the heart of this agenda is a desire to articulate aspects of being and existence with hyper complex phenomena. While we are familiar with the existing narratives of our environment - climate change, micro plastics in the ocean, loss of biodiversity, and deforestation of rainforests - part of the challenge is the way that these hyper complex landscapes are presented and reduced by modern thinking. This has led to a change in our value landscapes whereby rich experiences are being collapsed into 'data' flows and capital. To articulate experiences that resist easy reduction and instead invoke feelings, memories, aspirations and passions that evade resolution and reside within the terrains of poetry, magic and monsters creates a rich platform for new kinds of juxtapositions, synthesis - and insight.

Venice: The new circus city

Venezia: La nuova citta' circense

Rolf Hughes

What would it be to live in a world where urban infrastructure loosens its anchorage and floats, buildings steal away for nocturnal walks, lovers set up home in the ocean? *Venice: The new circus city*, comprising three prose poems, explores via three linked tropes of *ascension*, *excavation*, and *relocation*, how we might inhabit and engage with a world playfully transformed by living architectures.

Come sarebbe vivere in un mondo in cui l'infrastruttura urbana allenta il proprio ancoraggio e galleggia, in cui gli edifici sgattaiolano via per passeggiate notturne, e in cui gli innamorati mettono su casa in mezzo all'oceano? ***Venice: The new circus city*** *(Venezia: La nuova città circense), che consiste di tre poesie in prosa, esplora, attraverso i tre tropi connessi di* ***ascensione***, ***escavazione*** *e* ***dislocazione****, come possiamo abitare e coinvolgere un mondo giocosamente trasformato da architetture viventi.*

1. *Ascension*

> And in all things that live there are certain irregularities and deficiencies which are not only signs of life, but sources of beauty. All admit irregularity as they imply change; and to banish imperfection is to destroy expression, to check exertion, to paralyse vitality.
>
> John Ruskin, *The Stones of Venice*

It began while the city's population was mostly sleeping. Many subsequently recalled "frivolous and gentle" dimensions to their dreams. There had been much discussion about expansion. Some had spoken of blocks across oceans. Others felt the need to "drill down" to solve a chronic housing shortage. Several entries for an architecture competition proposed varieties of airborne parks, but the committee deemed these "unrealistic" from an engineering perspective.

According to the homeless, it was during the *blue* hour between night and dawn that the city's buildings started sighing. A soft billowing of gas winnowed through their pipes and valves, and their concrete facades appeared visibly to deflate. Today, deflating concrete structures has become an established practice, but at the time it was felt to be "speculative" and "avant-garde only".

Towards noon, over half of the city's infrastructure was floating. Roads, rail tracks, cycle lanes and tram tracks had become aerial spaghetti, while water pipes and electricity lines formed sparking knots, trailing grey ducts and crackling silver pylons. Waking to the shrill summons of an alarm in a still familiar bedroom then navigating a route to an unchartered workplace involved negotiating bewildered commuters slip-sliding through the sky like shoals of fish in oil. Children delighted in the absence of identifiable school runs, somersaulting down inclines, scaling opposing slopes, leaping from rooftop to lamppost while blowing bubble gum bubbles. Everyone rejoiced in being released from the city's hard, joyless carapace, which had proved good for grazing skin but limited at launching weightless poise.

And yet there were those who railed against the airborne city and wished to re-establish terrestrial relations on a gravitational footing. They claimed floating was an affront to democracy and wanted an "accountable" statement of its purpose so that people could make "rational" decisions as to its "quality", "relevance" and "impact". The social and ethical imperative of *standing on one's own two feet* was, they felt, under threat. And it was true that magazines poured scorn on *passé* navigational modes such as *stump*, *stamp* and *plod* as the majority of the citizenry had taken up the new way of interacting – deploying *float*, *grip*, *spin*, *tumble* and *catch* as if born to such effortless, aerial choreography.

It was late autumn – the sky was dark, swollen, sullen – few believed things would get better until the sun returned. The bloated dreamed of floating, while the floaters thought of anchoring their feelings and thoughts to the bruised earth below until the days began to brighten. Religious leaders sought to escape this dichotomy, arguing that what is important is what one *feels* while *traversing* from one plane of existence to another by means of the soul's *non-linear ladder*. Most, however, wanted a reliable map of the new city, so they could find their way around in the dark, rather than listen to honorific speeches about flipping through invisible layers.

Those more agile in navigating ambiguity tend to thrive in the absence of limits or definitions. When they congregate, a living murmurration eventually erupts. Look up, for they are often in the sky – and when you glimpse them, it's as if the laughing gods are sprinkling black pepper over their blue meatball.

One morning, while straddling a low, greasy wharf by a quay at the extremity of a canal, my long legs on each side down to the water, which had become black with stagnation, the black water yielding continually, letting my thoughts sink into soft vacancy, a faint scent of oranges and wood smoke winnowing over the stench of putrefaction, I saw you, tumbling across the sky, a possible pivot in this new world of rotation and churn; I would have gripped you as you neared, held tight until we hinged and fused, but you were already gliding to other co-ordinates, auto-smiling through the dense weather – our fingers almost touching, but trailing further and further away, plucked from their knuckles, pointing elsewhere, until – matchsticks in a storm – gone.

2. *Excavation*

> The mass of society is made up of morbid thinkers, and miserable workers. Now it is only by labour that thought can be made healthy, and only by thought that labour can be made happy, and the two cannot be separated with impunity.
>
> John Ruskin, *The Stones of Venice*

We slipped the buildings from their foundations until they started to tip forward and stumble into each other, a parade of architectural movements feeling their way past each other, groping blindly for a way out of the congestion and chaos, a way to light out for some other territory, somewhere – over the rainbow – beneath a bigger, bluer, more *dustless* sky (if such a place exists).

Several nights follow, wandering in dejected packs. Eventually they return – silent, sheepish – standing glumly to attention, as before, in the recently vacated knuckles of the city. Gradually, the metropolis resumes its familiar skyline. They will stray no more. Their only desire now is to wake within view of neighbourhoods, near and far, avoid window contact, expel all memory of the failed bid for freedom.

So much for the "built environment". As for the city's parks, they lie still, atrophied, vomiting green but barely breathing – their flora paralysed in the act of unfolding. A paralysed gesture impacts nothing but itself. I move: you extend. Revision is by addenda carried on a slowly exhaled sigh of carbonic acid – the fragile music of vibration touching silence. When the earth absorbs your remains, what need to seek out another spot to die? Chewed from below, dissipating above, the park's protoplasm is elaborated through non-residential minerals, *salts of the earth*. These it converts to vagabond petals shackled to stalks.

The ants tell another story. Their heads blinded and blackened, these epileptic soil bulldozers, programmed to incessant aesthetic revenge, hollow out mountains while we sleep, half-submerged, feet like leather daffodils, dreaming of the day these grinding earthworks finally fall still.

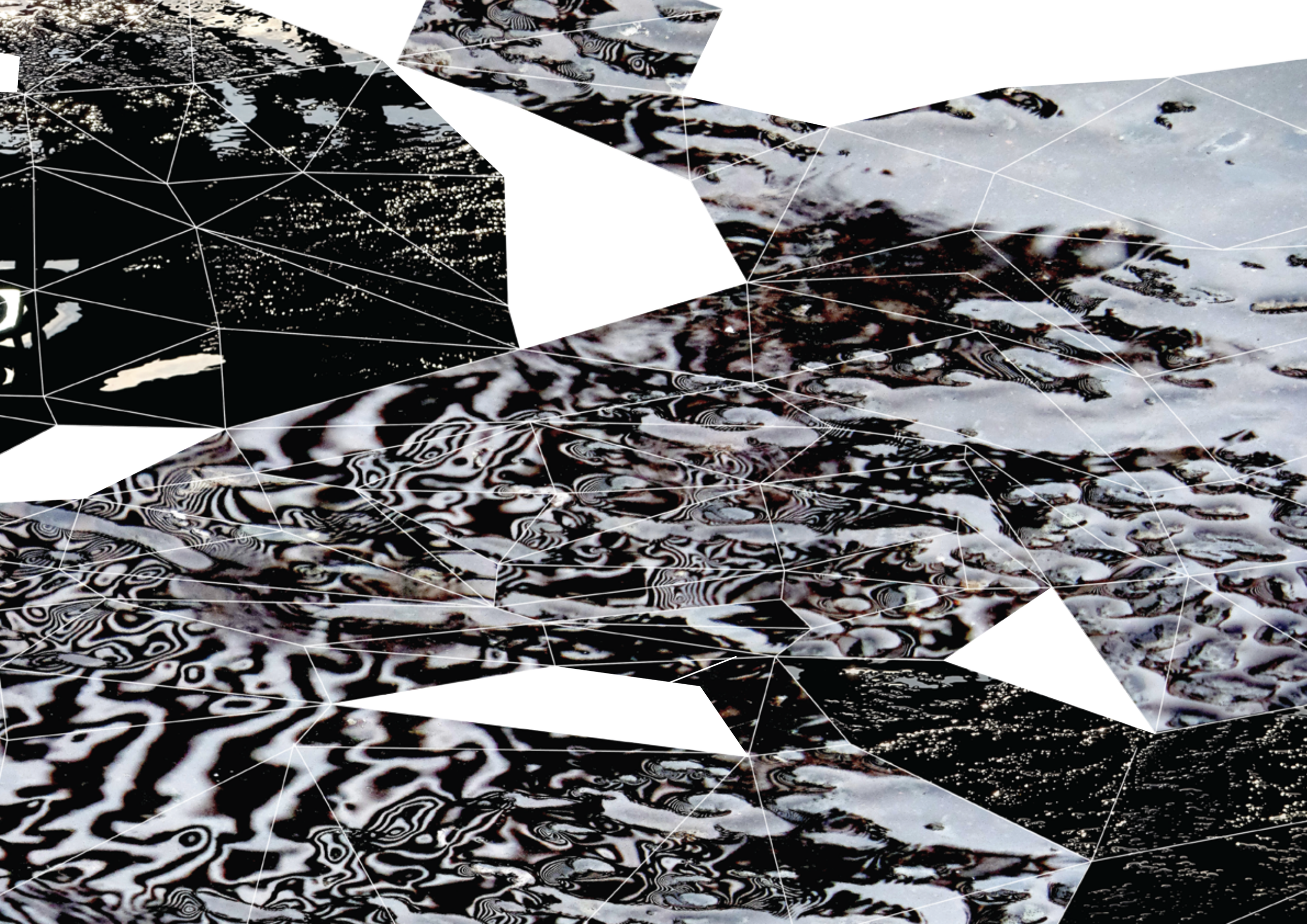
3. *Relocation*

> [I]f you will make a man of the working creature, you cannot make a tool. Let him but begin to imagine, to think, to try to do anything worth doing; and the engine-turned precision is lost at once. Out come all his roughness; all his dullness, all his incapability; shame upon shame, failure upon failure, pause after pause: but out comes the whole majesty of him also, and we know the height of it only, when we see the clouds settling upon him.
>
> John Ruskin, *The Stones of Venice*

It was decided we would relocate to the ocean, weave a home from the warm currents flowing between us; crustaceans would shape our cellars and bedrooms, seaweed our curtains, and we would be rocked to sleep by the infernal clattering of the churning tides. It's continually collapsing, our hearth and home, repudiating each form the moment it is suggested. Enslaved to gravity, it tosses and turns us as a living kaleidoscope for the sun and moon. The ocean is obliged to maintain the pretence that, left to itself, it would do more than give up, fall flat, leak away. Helicopters are soon buzzing dully overhead, paparazzi seeking to snap us – nudists in a liquid cage. We fancy a bit of shade, plant a bit of upside down garden, but it doesn't take and we don't have enough anchors to stop it all washing away. It's too sensitive and restless, this shiny, white medium – tip it, and it runs childishly away.

Predictably, the municipality dropped someone to measure our boundaries. But the ocean is an unpredictable, measureless roil. *Alas, poor taxman!*

I would dig a grave, but I lack a spade.



Biographies
Biografie

RACHEL ARMSTRONG (LA PROJECT COORDINATOR, EVENT HOST)

Armstrong is professor of Experimental Architecture at Newcastle University. She designs lifelike systems for the built environment using technologies that manipulate the building blocks of life such as synthetic biology and smart chemistry. Armstrong trained as a medical doctor graduating from the University of Cambridge with First Class Honours and prizes. She completed her clinical training at the John Radcliffe Medical School at the University of Oxford. She also has qualifications in general practice and a PhD funded by the EPSRC in Architecture from the Bartlett School of Architecture, University College London. Armstrong has worked across many disciplines as a multi-media producer, a science fiction author and an arts collaborator. She is a Robert Rauschenberg Foundation Fellow for the Rising Waters II confab (April May 2016), TWOTY Futurist of the year 2015 and a 2010 Senior TED Fellow. Rachel was named as one of the top ten UK innovators by Director Magazine in 2012 and featured in the top ten "big ideas, 10 original thinkers" for BBC Focus Magazine. Her TED book on Living Architecture was #1 Bestseller in Biotechnology on Amazon. Her new book *Vibrant Architecture: Matter as CoDesigner of Living Structures*, explores prospects for transformations of matter from inert configuration into lifelike habitable structures, which prompts a re-evaluation of how we think about sustainability in our homes and cities. Her current publication *Star Ark: A Living, Self-Sustaining Spaceship* discusses how we might build a world from scratch so that we may inhabit our present and future worlds differently.

ROLF HUGHES (INVITED GUEST)

Professor of Artistic Research at Stockholm University of the Arts (inaugurated 2014), Hughes is a prose poet, essayist, epistemologist and researcher of innovative forms of artistic and transdisciplinary practices over more than twenty years. He holds a First Class degree in English and Related Literature (University of York), an MA (with Distinction) in Creative Writing and the first ever PhD. in Creative and Critical Writing funded by the British Academy from the University of East Anglia, UK. He has been expert advisor and reviewer in artistic research for the Swedish Research Council, the Norwegian Artistic Research Programme, the Austrian Programme for Arts-based Research (PEEK), the Ministry of Scientific Research and Education (MIUR, Italy), VolkswagenStiftung/ Volkswagen Foundation (Germany), and the Fundação para a Ciência e a Tecnologia (FCT) – the national funding agency of Portugal for science, technology and innovation, in all scientific domains, under responsibility of the Ministry for Science, Technology and Higher Education. Hughes has been Guest Professor in Design Theory and Practice-Based Research at Konstfack University College of Arts, Crafts and Design (2006–2014); Senior Professor in Research Design at Sint-Lucas School of Architecture (KU-Leuven, Belgium), where he helped create and develop an international, design-led PhD. programme (2007–2013), and has served two terms as Vice President of the international Society for Artistic Research (elected by the SAR membership 2011-2013, unanimously re-elected 2013–2015). He is co-founder of Radical Circus (2016), a group dedicated to radical experiments in artistic research and contemporary circus arts. Alongside Rachel Armstrong, he is exploring the contribution of poetry, choreography, and performing arts to the field of experimental architecture, including the conception and design of a third millennium experimental research laboratory.

MASSIMO LEPORE (INVITED GUEST)

Partner/senior architect of Studio Tamassociati, an Italian team of architects based in Venice since 1996. Specialising in sustainable architecture and humanitarian projects, they are known for their work for Emergency, an Italian non-governmental organization providing treatment for civilians in war-zones worldwide. Tamassociati designed health-care buildings for Emergency in Sudan, Sierra Leone, the Central African Republic and Nicaragua. Their Salam Centre for Cardiac Surgery in Khartoum, which opened in 2010, received the Aga Khan Award for Architecture in 2013.

IOANNIS IEROPOULOS (LA CONSORTIUM MEMBER, EXPERT)

Professor of Bioenergy and Self-Sustainable Systems and Director of the Bristol BioEnergy Centre, UWE. He has an interest in waste utilisation and energy autonomy and produced the EcoBot family of robots, which are powered by microbial fuel cells (MFCs) fed on organic waste. He is a Bill & Melinda Gates Foundation grantee for the "Urine-tricity/Pee Power" project, which is developing the MFC technology for Developing World Countries. He is also the principal investigator on a number of projects, looking into biodegradable materials, funded by the Leverhulme Trust and the European Commission FP-7 as well as H2020 programmes. He has published more than 80 peer reviewed journal papers and is frequently an invited speaker at numerous conferences and workshops, such as ECS. He is a member of the EPSRC Peer Review College and the Associate Editor for the Journal of Sustainable Energy Technologies and Assessments (Elsevier).

JUAN NOGALES (LA CONSORTIUM MEMBER, EXPERT)

Dr. Juan Nogales is currently a Junior PI (JIN) whose work is focused on deciphering the multidimensionality of microbial metabolism, its evolutionary and biotechnological implications. Juan joined the emCIB lab in 2013 where he has developed a genome-scale metabolic modeling platform and leads systems biology projects in the group. Currently he is PI and maximum responsible of RobDecode, a project focused on unraveling the metabolic robustness in bacteria and LA, a project aimed at engineering synthetic microbial consortia as bio-sustainable building blocks for living architecture. He is cofounder of Darwin Bioprospecting Excellence, a biotech company which aims to offer bacterial solutions towards biosustainability.

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