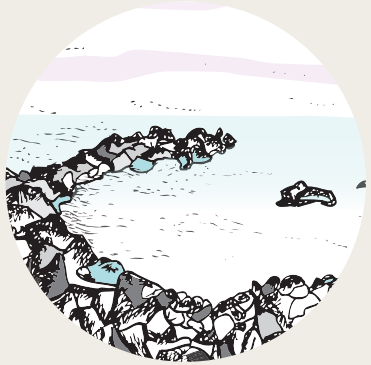

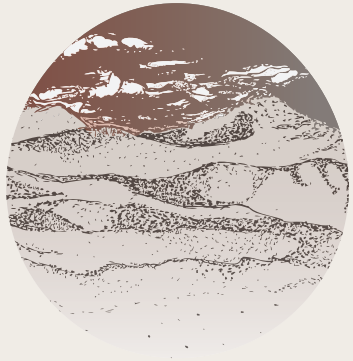

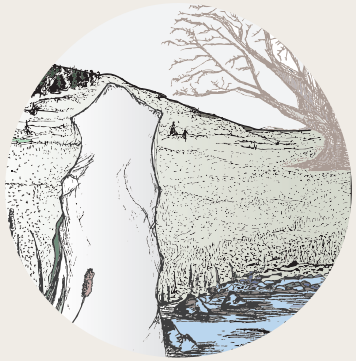

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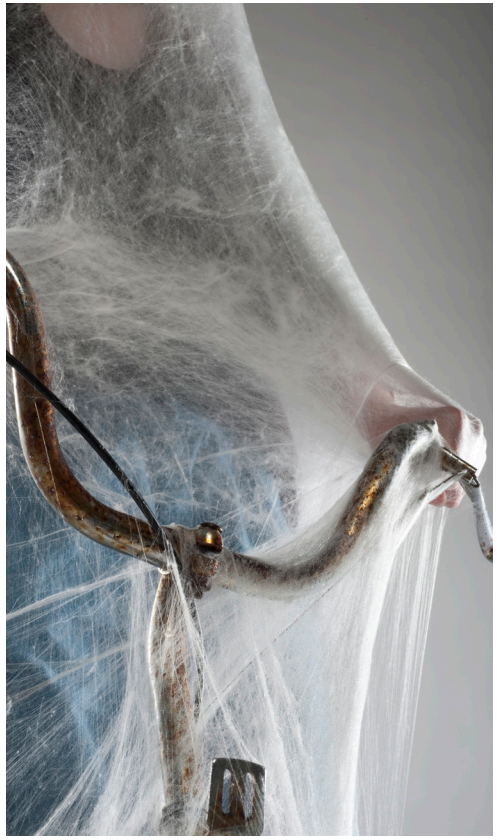
Mooring Our Bodies

Users around the world will be able to download and consume biological code. This code will allow the person to manufacture chemical signals through signal transduction and pheromonal synthesis. The code will be sourced from an open source library and individual strains pertain to geographic location, and thus, specific species control. The person may choose from available and preferred species; the most effective being colony and hive animals. The code is expected to evolve as users feed back into the library with improved revisions and amateur 'biohacking' code. Expertise will therefore be communicated and shared between scientists and developing culture with relevant experience to contribute.

The slave animals (or organisms) will consume the code's signals which will alter their behavior, prioritising support of the human above all else. Ideally they will exist as naturally as possible, feeding, procreation and dying without unbalancing their traditional eco-system.

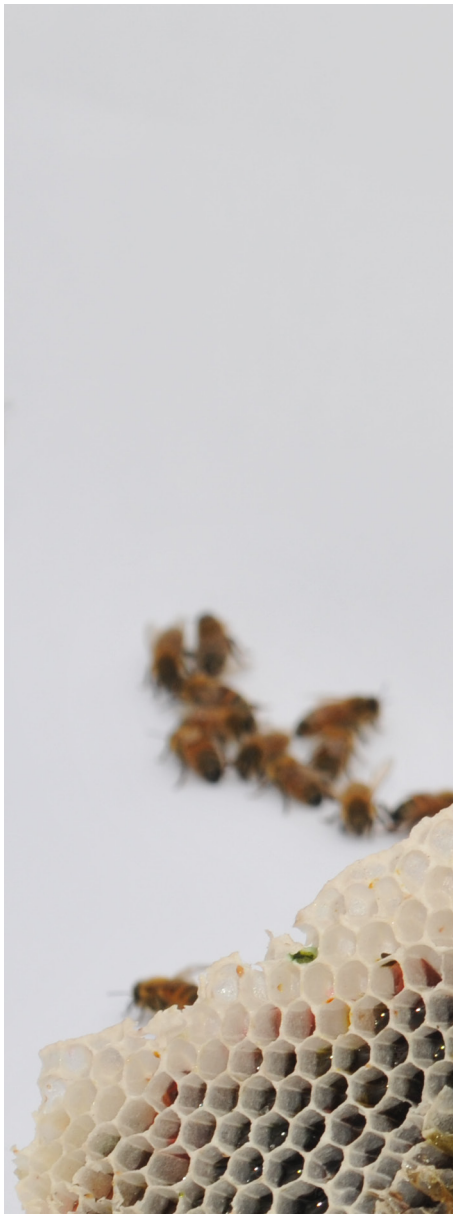
Urban regions

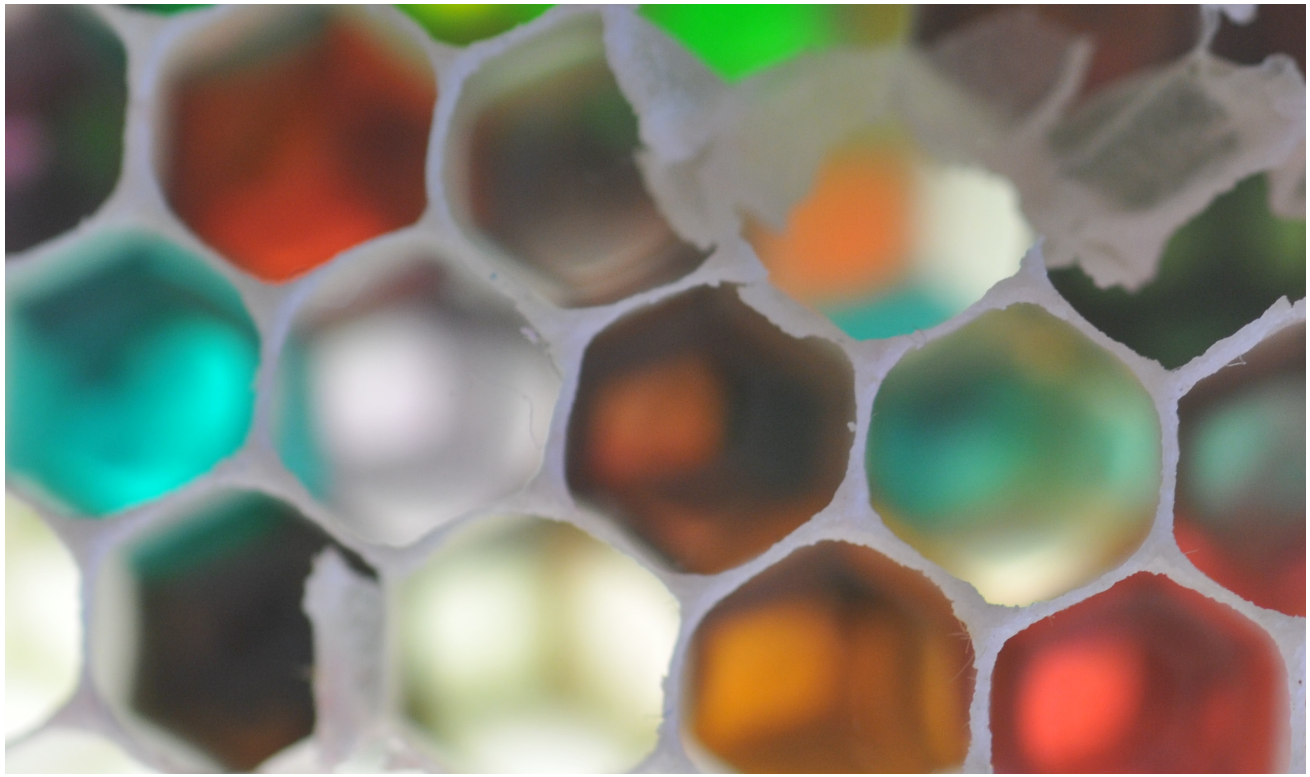
Nursery Web spider or Pisauridae Arachnid are globally widespread and fairly common. They would be used in preexisting enclosed environments such as outdated cars to build supportive webs. Genetic gender control would be used to control population and inhibit territorial aggression.



Temperate regions

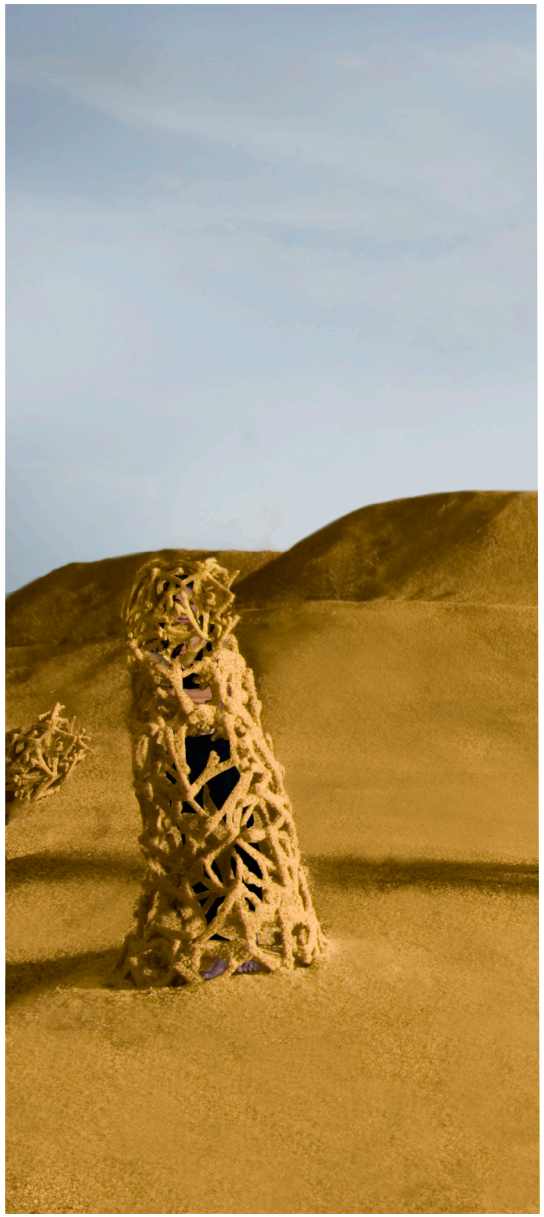
Entire colonies of honey-bees may be controlled using pheromones, colour training, magnetism, and ‘waggle dance’ simulation. The bees may be trained to retrieve specific nutrients from specific locations. Their honey and propolis is antibacterial and weatherproof. The bees and larvae would benefit from human body temperature.

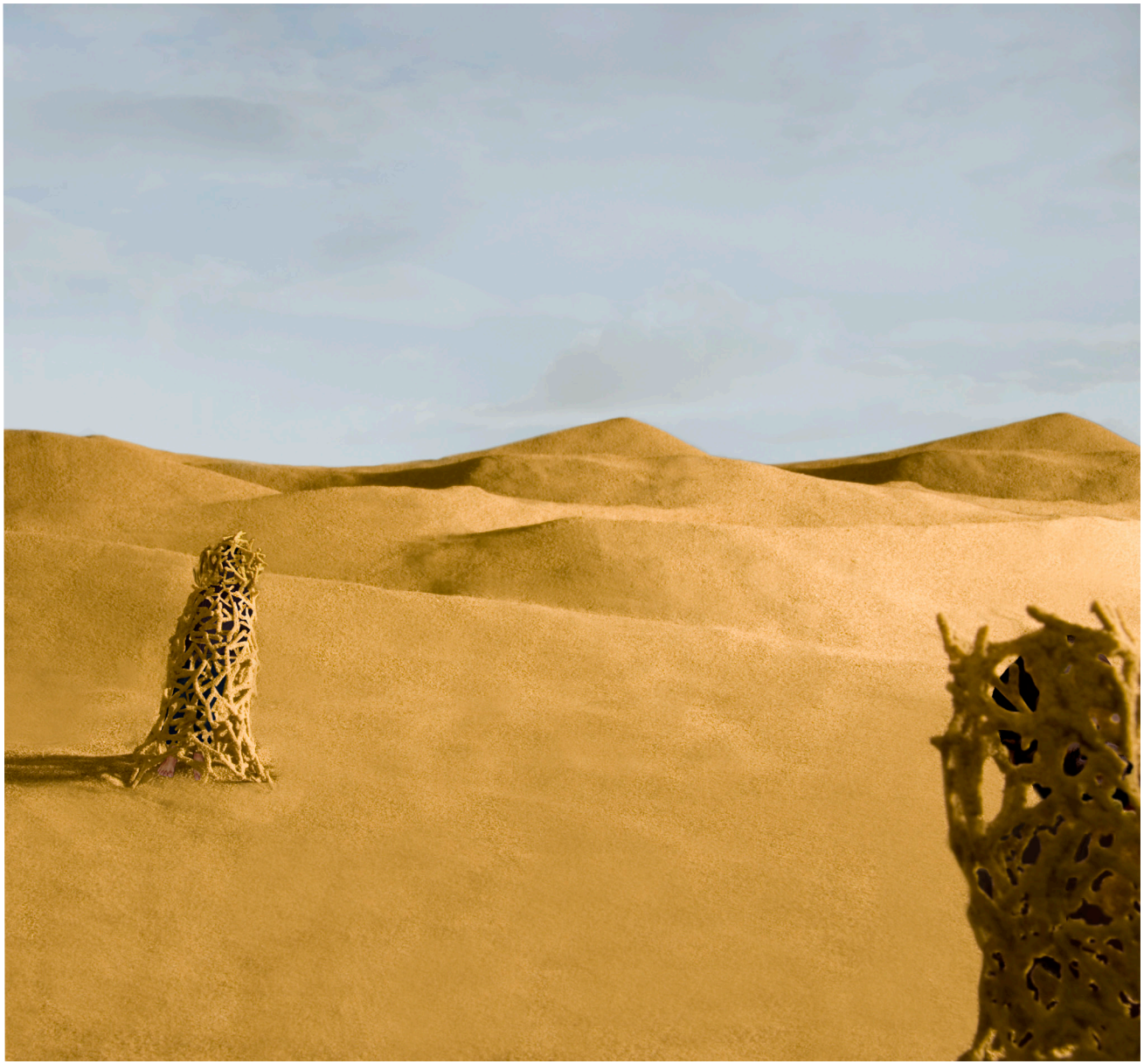




Desert regions

Sand may be solidified into a sandstone-like material by using naturally existing bacteria, ‘Bacillus Pasteurii’. The architecture could be controlled to mimic the behaviour of other animals living in arid regions such as termite cooling ventilation, cacti atmospheric water harvesting and subterranean habitation of certain species.





Aquatic regions

Specific varieties of protocells may be used to biomineralise under water into a shell-like material. This would occur in shallow tidal pool areas. The growth environment and carbon dioxide from the host human would benefit the protocells. Salt water may be desalinated by engineered bacteria.

"At this point in our individual and collective journey, story is our best ability to transform what we perceive as the mystery of our universe's dark, chaotic abyss into some relative sense of human order. This is what makes story our finest, creative and integrative attempt -- and grandest, expressive wish for knowledge, wisdom, understanding"

-Jeffrey Courion

Put yourself forward 500 years. The population is immense yet the earth is empty, our consciousness resides in the biological computing system that has become the earth.

Some call it the perfect society, a place without bounds, and endless possibilities. But even the possibilities grow tiresome. Without challenges and boundaries the human imagination has grown stale, “brilliance” has sunk to mean merely “different”, and true art has been left behind.

So we are now looking back at the true zenith of human society, to discover their way of life, and what truly made them great. We are rediscovering the earth and how their relationship with it was so important. This is our report.

23 March 2510

Human remains were discovered, analyzed and dated to 2050. The composition of the human DNA implied that samples from diverse geographic locations shared a common alteration; the altered sequence manifested in three family groups. Although the sequences varied slightly in design, each family appears to have been linked to others of its kind.

Recovered history of life in 2050

The internet that originated circa 1990CE proliferated, suffered demise due to the limitations of its infrastructure and administration by a single nation (the United States of America). Alternative networks emerged, each administered by independent corporations, promising greater freedom, instantaneity, and global knowledge. These human meshes consistently evolved into immersive virtual environments. As humans migrated to a life of greater virtuality, nation states lost geographic relevance and citizenship became based on subscription to one’s chosen network.

Just as with the “Internet”, there were compatibility issues between the identities of individuals and that of the collective populace. People of different religions, cultures and value systems began demanding the enforcement of their moral codes. No one standard could be imposed without offense to another: Some users demanded no virtual murder or sex, some demanded no censorship. While the “Internet” struggled with illegality, its laws were founded on the principles of one nation only and a small population within it. The networks of 2050 were democratized to a greater extent. As the corporate administrators of the networks each failed to quell the disquieted communities, a single common enforcement was agreed upon.

The one common aspect to each subscriber was their attachment to their physical existence. The body began to be used as collateral to balance the morality of the virtual. Instead of imposing laws to prohibit certain behaviors, network users were required to adopt an augmented reality vision code of which honesty was the only enforcement. An individual’s action in their virtual existence manifested in how others saw them in their physical existence. Users were thereby constrained from allowing their two identities to stray too far from one another. Therefore, individuals were able to base their own value judgments on those around them. Those whose behavior verged on the limits of personal integrity, risked being judged and shunned from their physical communities.

Recovered history of life in 2050

As the Human race advanced towards our current existence, sustainability dictated that the majority of peoples’ time was spent within a virtual existence; much like a primitive version of our existence today.

As a rejection of the corporate meshes of 2050, an ‘open-source’ bio-code entitled “husbandry” was distributed globally. This was the first evidence of partial singularity and a destruction of classism. It seems that the code allowed users the ability to

produce zoological chemical signals. Depending on their location, subscribers could harness the abilities of a variety of animals to build stasis architecture, which their physical bodies could inhabit while they participated in their virtual existence.

These husks were utilized around the world

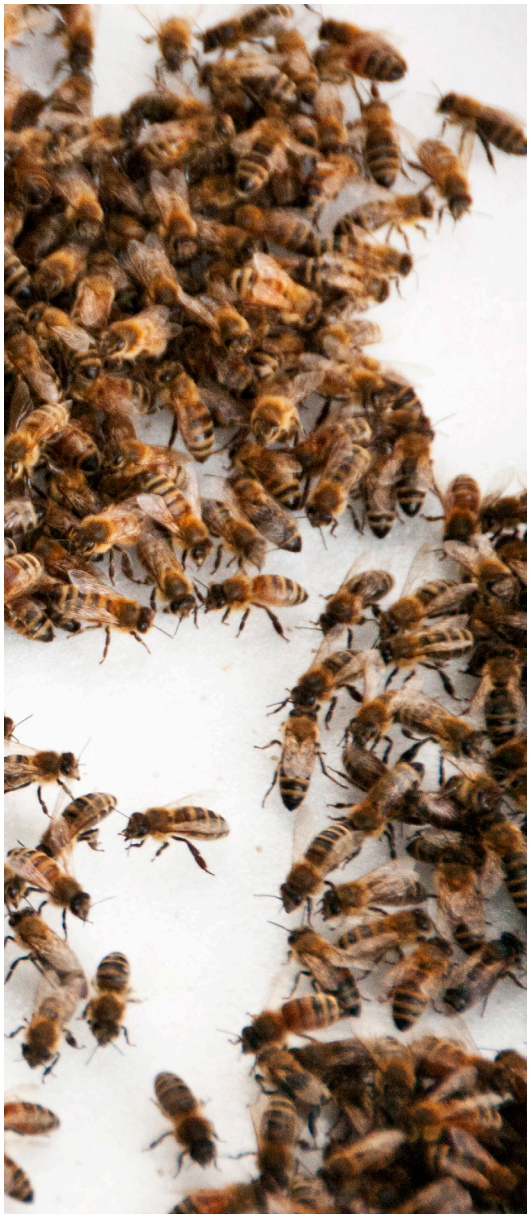
To date, remnants of the code and surviving “husks” have been found on the Asian, European, and African continents. The codes of the latter two are sufficient to recreate synthetically. It appears that the European variety utilized a biomineralizing protocell while the African variety utilized the Apis Mellifera Scutellata or honey bee.

Secretions from the human body were coded in such a way that the slave animals built body-encasing architecture in order to protect and provide for the human’s body. Nutrient and mineral deficiencies were detected and administered transdermally.

While moored, the human bodies utilized augmented hair follicles to send secretion signals and anchor the architectural garment. Examples from various sites also suggest that the size of the architecture was dependent on the abundance of resources surrounding the human body.

Human lives were inherently tied to the earth; biological computing was tied to the earth’s rotation, keeping societies in sync with their location. Their relationship with animals determined their existence. They were entirely dependent on the earth’s resources forcing them to address and overcome the boundaries that the earth presented.

"It is a point where our old models must be discarded and a new reality rules. As we move closer to this point, it will loom vaster and vaster over human affairs till the notion becomes a commonplace. Yet when it finally happens it may still be a great surprise and a greater unknown." -Vinge, V. in Newitz

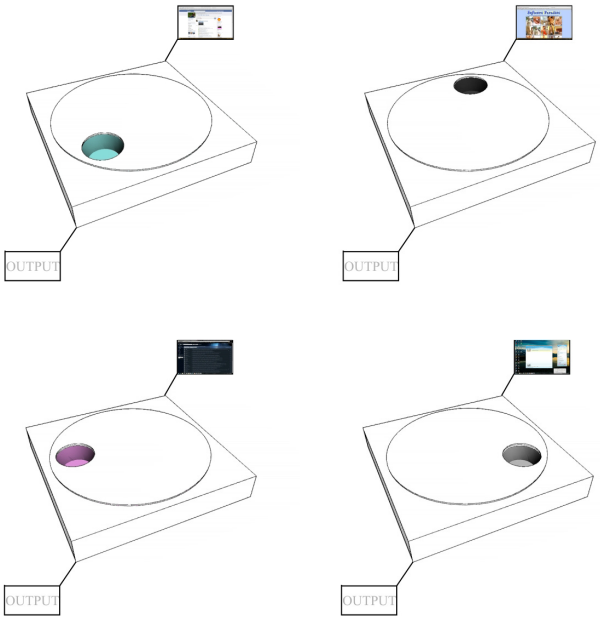


BEES

Influencing bees to build architecture
Three weeks. June to May 2010.
Masterton, New Zealand.

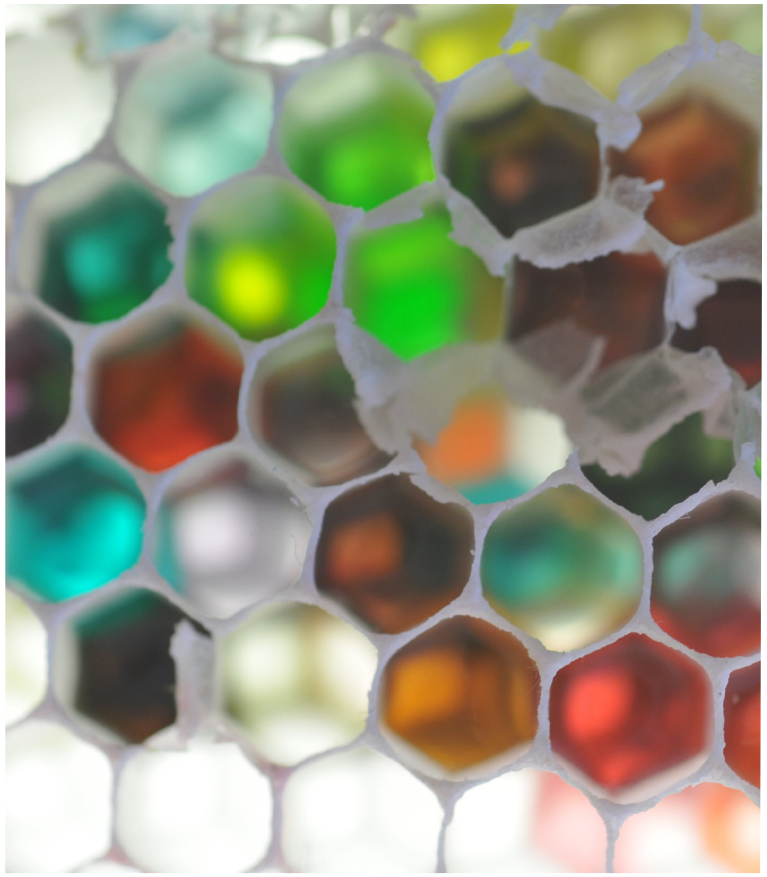
A custom built bee hive box was constructed with wool insulation and electric heating in the wall space. Inside wax scaffolds of forms (derived from earlier research) were placed.

Approximately 10,000 bees were tipped into the box and sealed in for 12 hours. Following this period of forced habitation, an augmented source of protein was installed and a hive entrance opened.

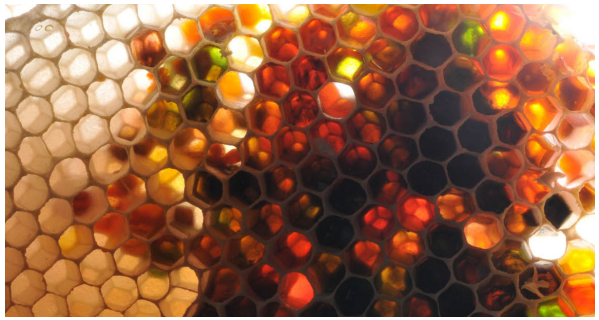


An automated feeder box was installed.It contained three primary colours and black sugar syrup. A small embedded computer allowed the bees access to one colour per day from 11am until 1pm.

The daily release of colour was based on signals reflecting the online actions of a test subject located in Wellington. For example, if the majority of time spent on the internet was on a social networking site, then yellow would be given to the bees for that day.



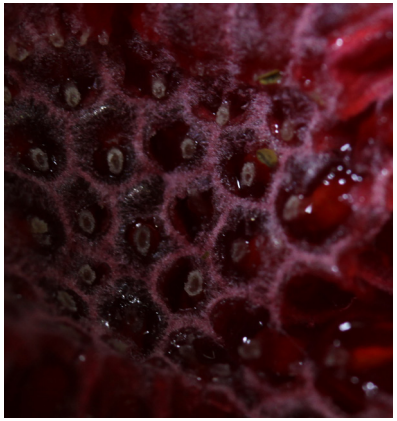
Whilst the hue was controlled by online activity, the tone was influenced by the health of the test subject. Health values were determined by daily blood glucose levels which corresponded to length of time (minutes) that the black syrup was exposed to the bees.



The end result was ‘architecture’ which symbolically reflected the online actions and physiology of the person it was built around.



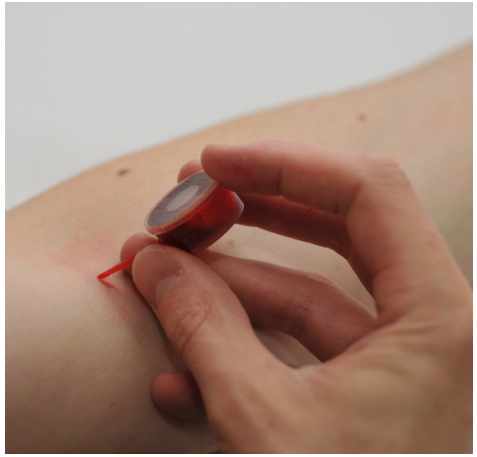


Looking at the natural forms of growth and 'housing, the interaction of skin with flesh, and surrounding with object.

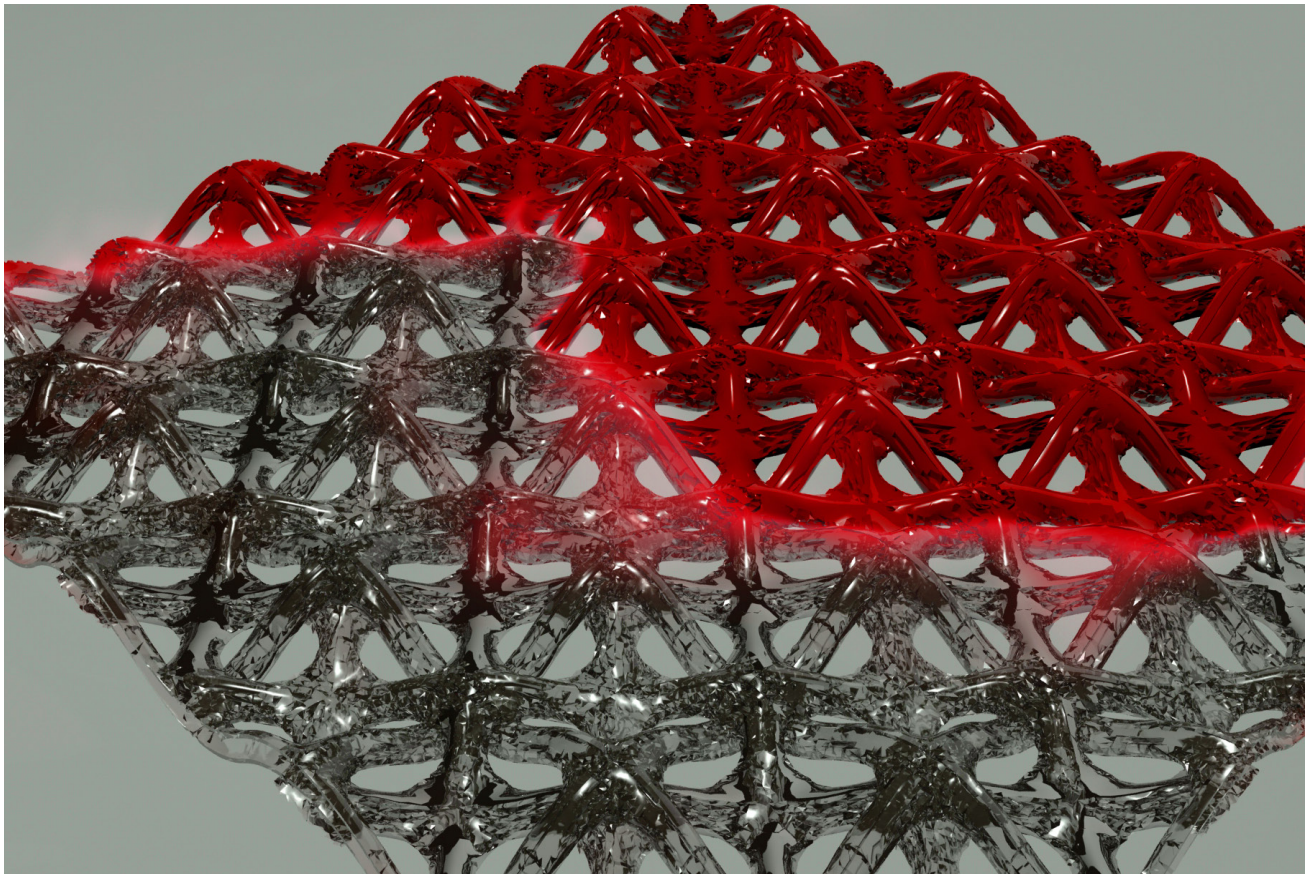
Mould seemed like a readily available organism that created architecture around existing objects. The thought being that mould could keep is warm, some mould is edible etc. It is from this experiment that we started looking at symbiotic relationships between living organisms and humans.
There were also interesting precedents seen in slime mould which can be used for mapping efficient transport routes.

This experiment looked at architecture. At this point we were particularly interested in sensation and touch and making the physical world as immersive as possible. For this experiment we physically burrowed through felt to investigate the experience of a new architecture and to look at the resulting forms.

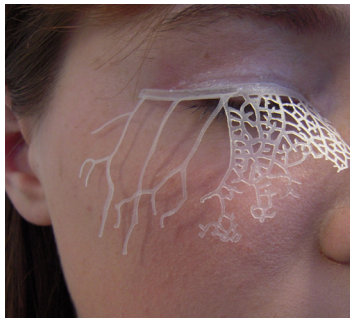


These two experiments were inspired by blood plastic which was developed at Waikato University.
This first experiment looked at creating a protective exoskeleton from one's own blood. Blood would be extracted though implanted hair follicles and react with a compound on the skin.

This second experiment looks at the creation of objects. If objects can be made from blood then it is feasible that people could have IV-like attachments into which blood would slowly drip to create possessions.
Alongside these experiments we contacted Dr Verbeek from Waikato university, and also obtained samples of blood plastic to experiment with.



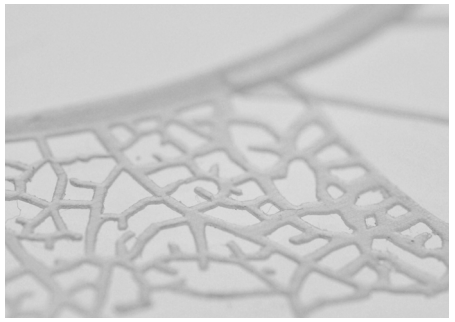
A wearable sub-dermal catheterized implant was protyped. Bioluminescent algae was introduced into this synthetic venous system where it could feed on the glucose and oxygen in the human blood. The warmth of the human body contributed to its survival. The result was a glowing arm stimulated by accelerative movement. This dermal patch looks at the symbiotic relationship between bio luminescent algae and humans. We tested feeding algae with blood with a positive result.

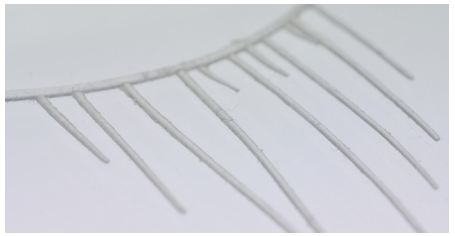


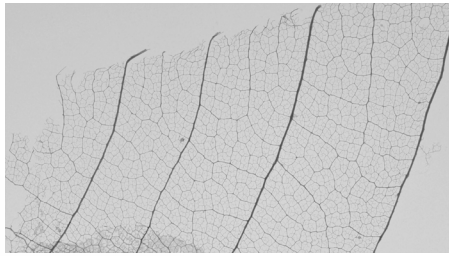
These eyelash experiments explored various aesthetics; utilising different materials to communuicate how the body could adapt to provide, protection and awareness.

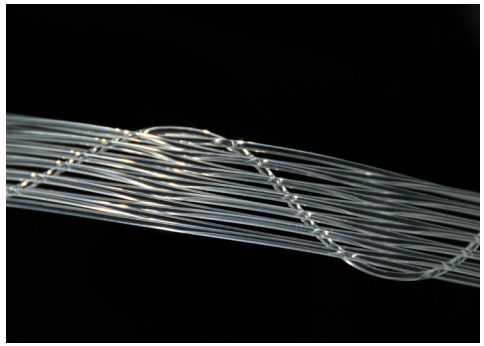
Elements such as fashion, beauty and perfectio were incorperated.

The eyelashes grow form the eyelid as a second set; communicating the bodys emotions, health and wellbeing through the amount of growth breakage and colour.

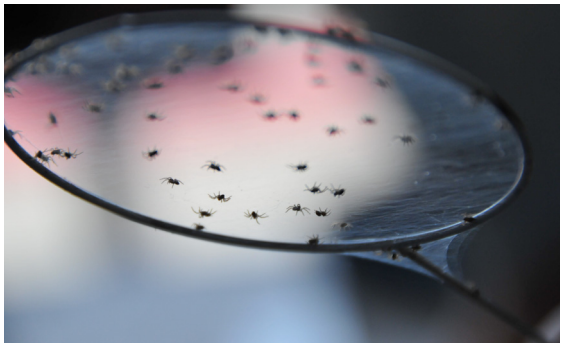


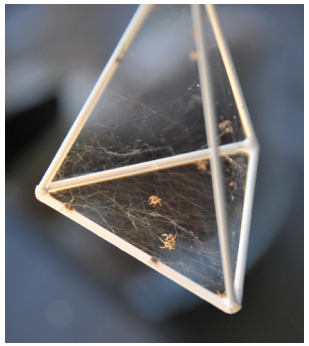


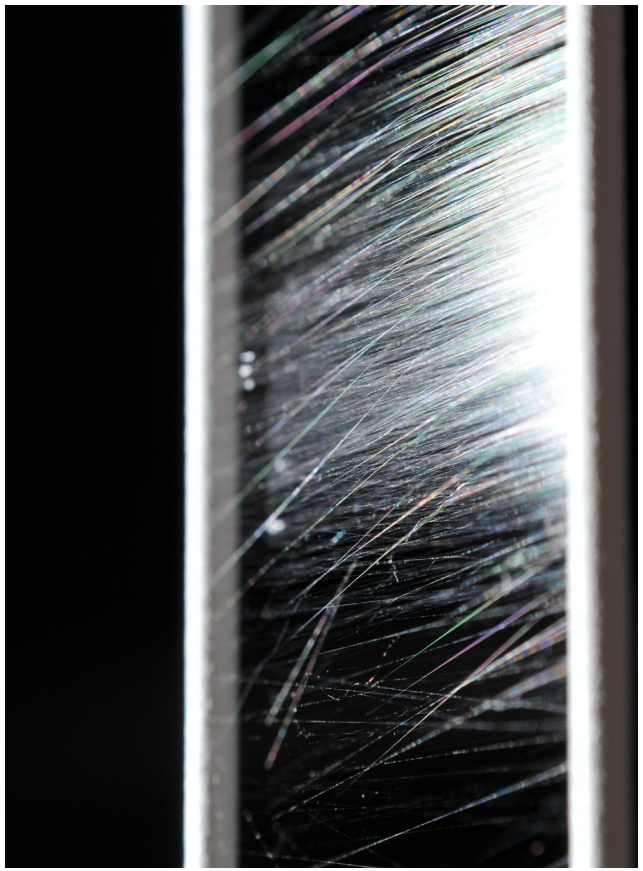




Bodily fibres
This experiment looked at how humans could grow their own protective exoskeletons from Keratin, which is naturally grown out of the body as finger and toe nails. This would act as a protective layer as well as a personal statement as each individual would be able to control how their exoskeleton grew.



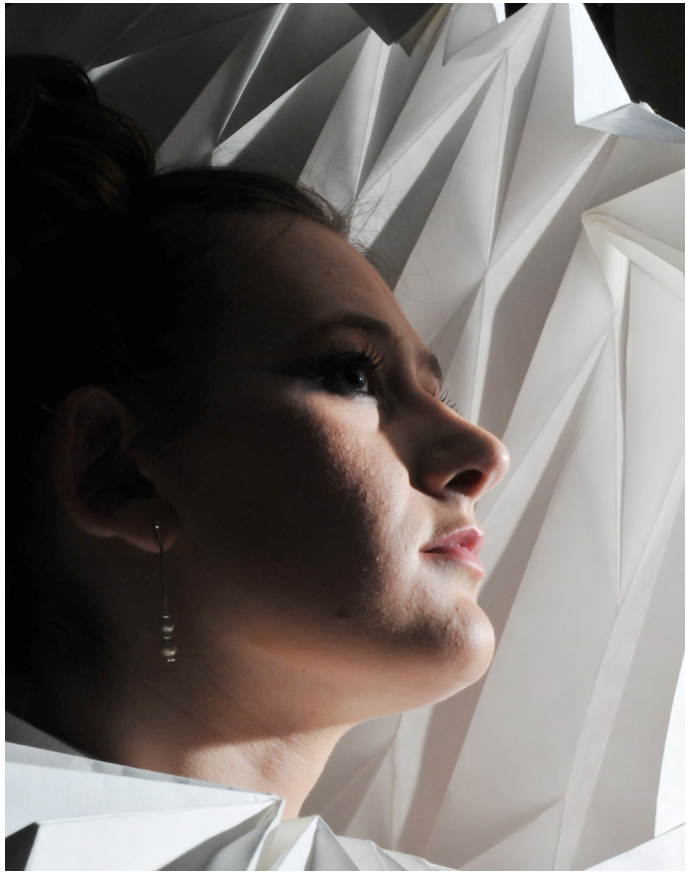




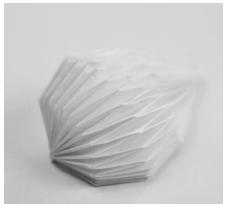
These experiments looked at making natural textiles with as little effort on our part as possible.

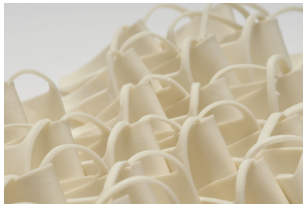
Ultimately enslaving spiders to make stuff for us.

making a “manufactured” natural environemnt.



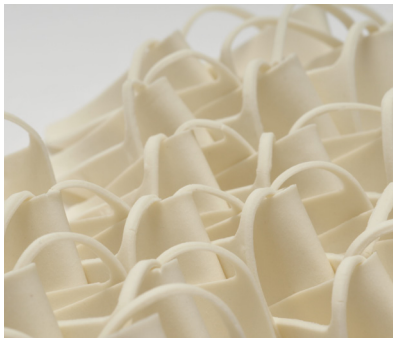
Wearable architecture creates an efficient versatile form of protection. These experiments are initial form studies looking into versatility and wearability. They became the basis for the initial bee experiments and led to the modular form of the porcelain experiments.

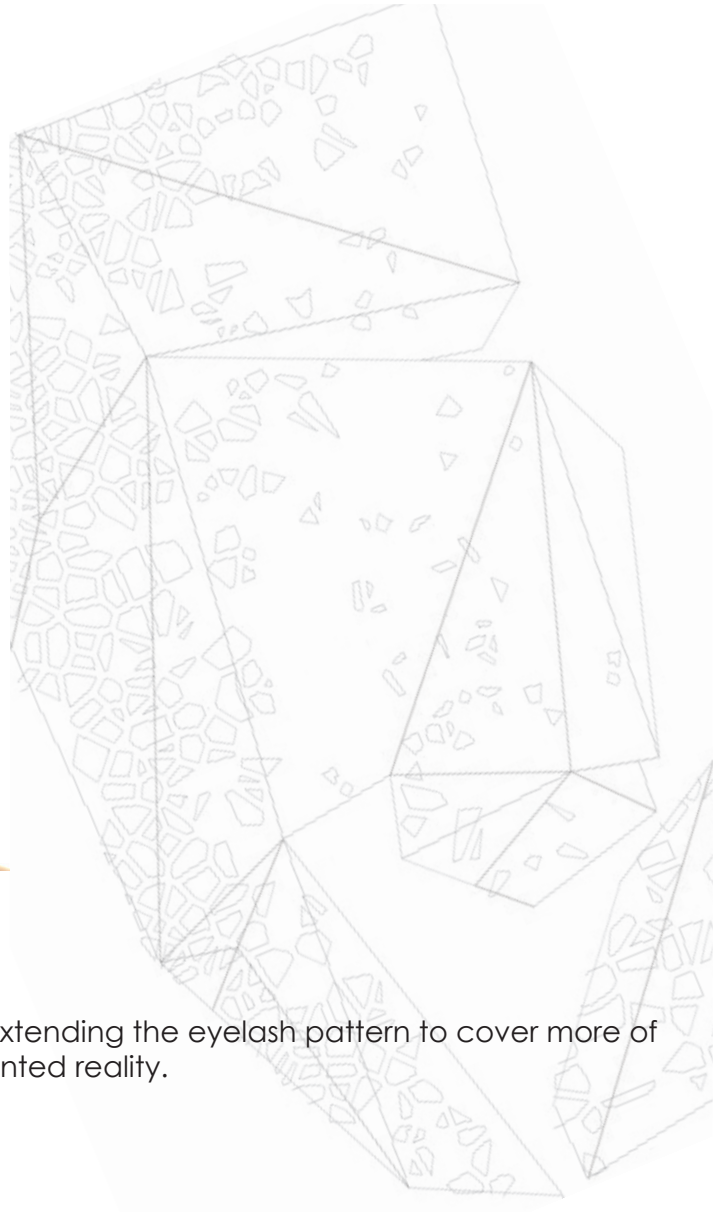




Initial bees wax experiments.
This shell, based on earlier form studies, acted as a base for the bees to build on.

This is created from flexible porcelain, a material very close to that produced through bio mineralization. The form is based on the earlier form studies. It is modular and versatile. The modules are tiny in comparison to the structure they can make. Each module allows another level of movement resulting in a ranges of flexibility. Similarly,through the combined small movements of individual vertebrae, a spine is allowed a large range of movement.
Interestingly, Benjamin Mathewson, a researcher in bio mineralization, was impressed by the structure's organic references and similarities to how micro organisms form their structures.





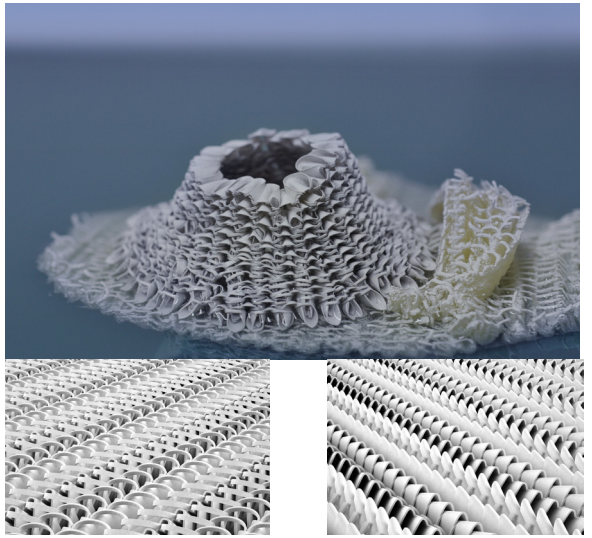
Augmented Reality.
This mask is an idea developed through extending the eyelash pattern to cover more of the face. It becomes a screen for augmented reality.

Geographic region:
Today's saharan belt, africa

method of construction:
bacillus pasturei bacteria.
cements sand into sandstone.

duration for growth:
24 hours for solidification. full form growth dependent on weather and wind.

symbiotic relationship:
human: fed though capillary action from ground 'roots'
bacteria: warm and stable scaffold to exist upon.
consumption of excrement.

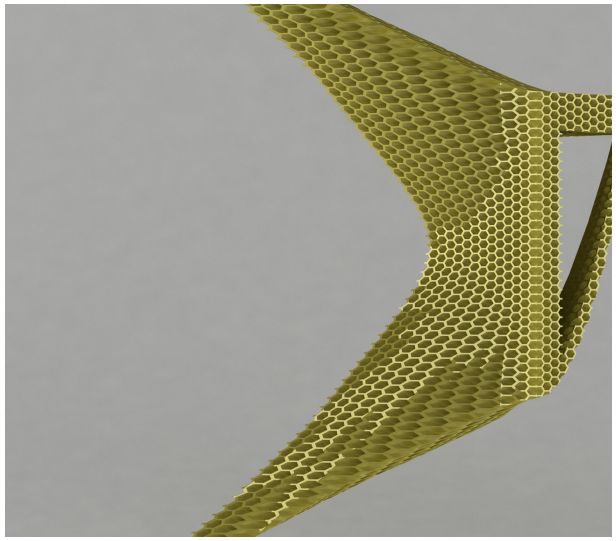


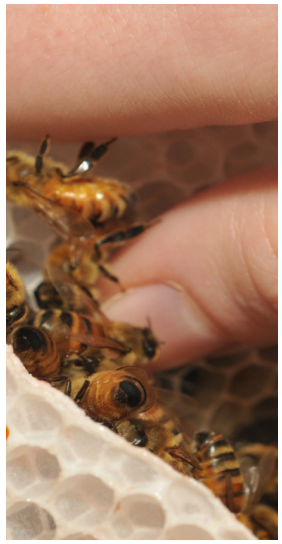
Geographic region:
global tepid tidal pools

Method of construction:
biomineralizing protocell organisms

Growth duration:
3 weeks to encase + continuing growth

Symbiotic relationship:
human: fed nutrients orally.
Protocells: scaffold, carbon dioxide, protection.



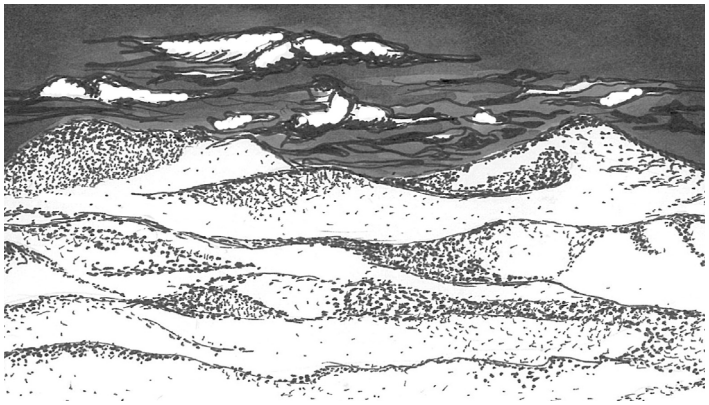


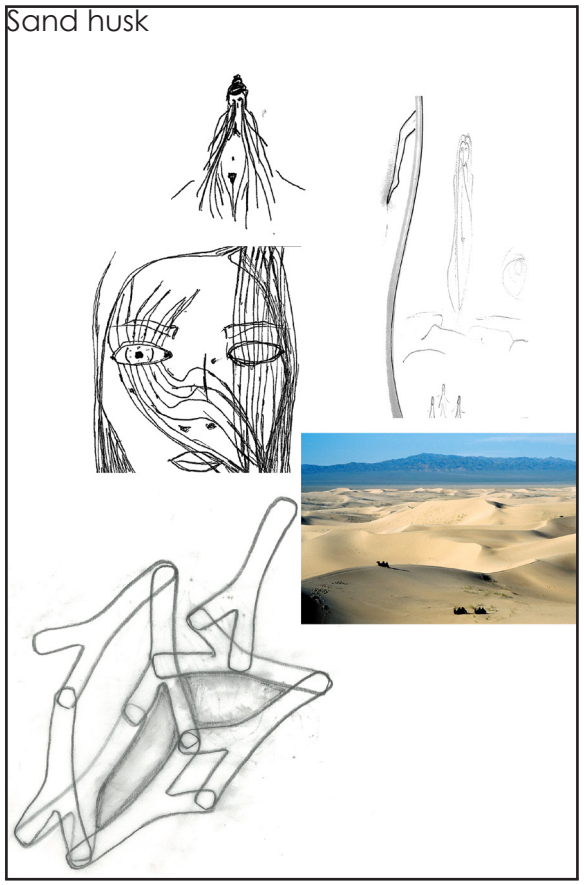
Geographic region:
Any location with preexisting honeybee population; typically lightly wooded.

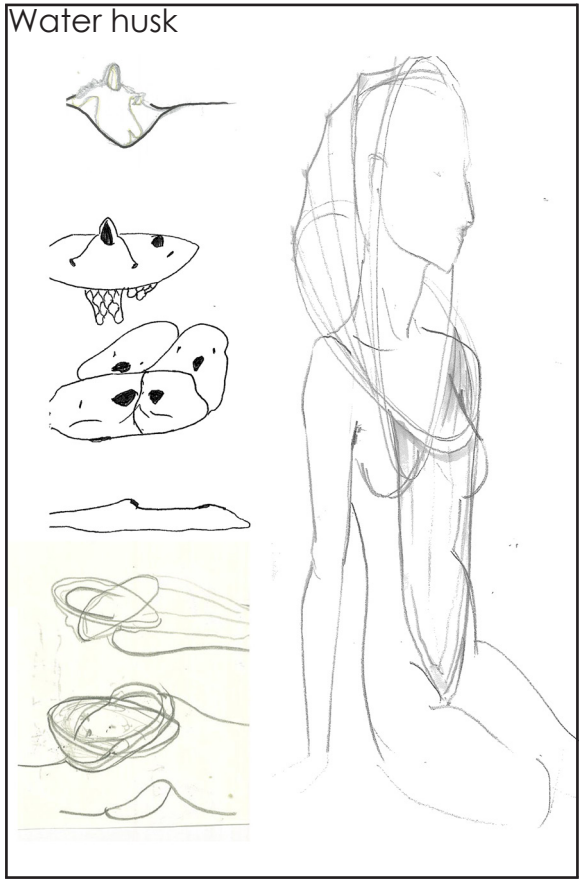
Method of construction:
Varieties of Apis genus (honeybee) wax.

Growth duration:
summer season growth. 20,000 bees = 3 weeks.

Symbiotic relationship:
human: fed nutrients transdermally.
bees: warmth, protection.

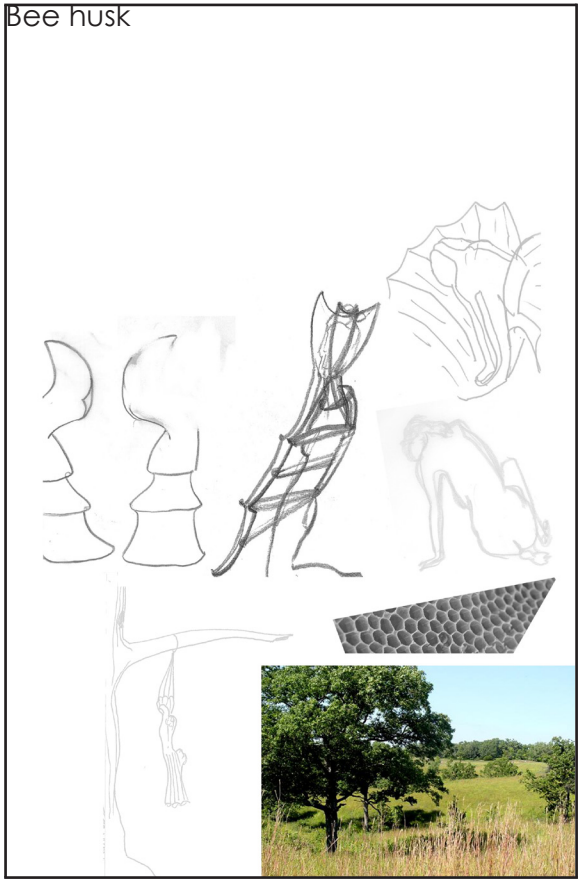




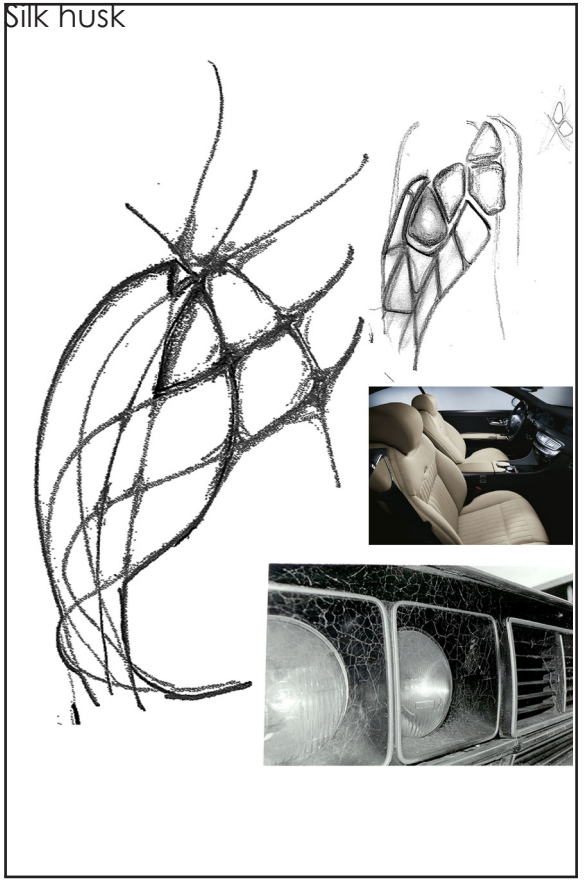


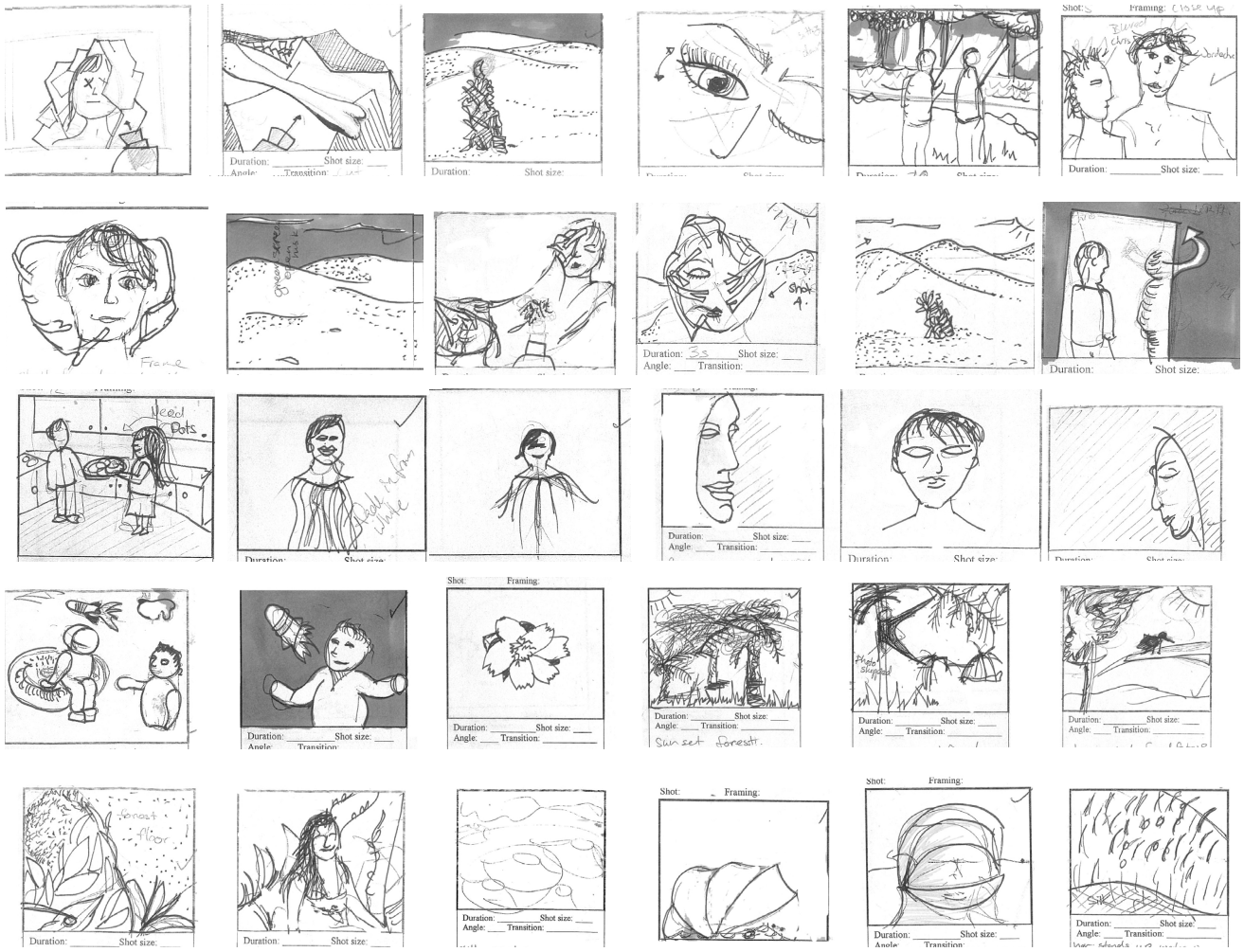
Initial sketches and investigations in to area specific husks

Bee husk



Silk husk



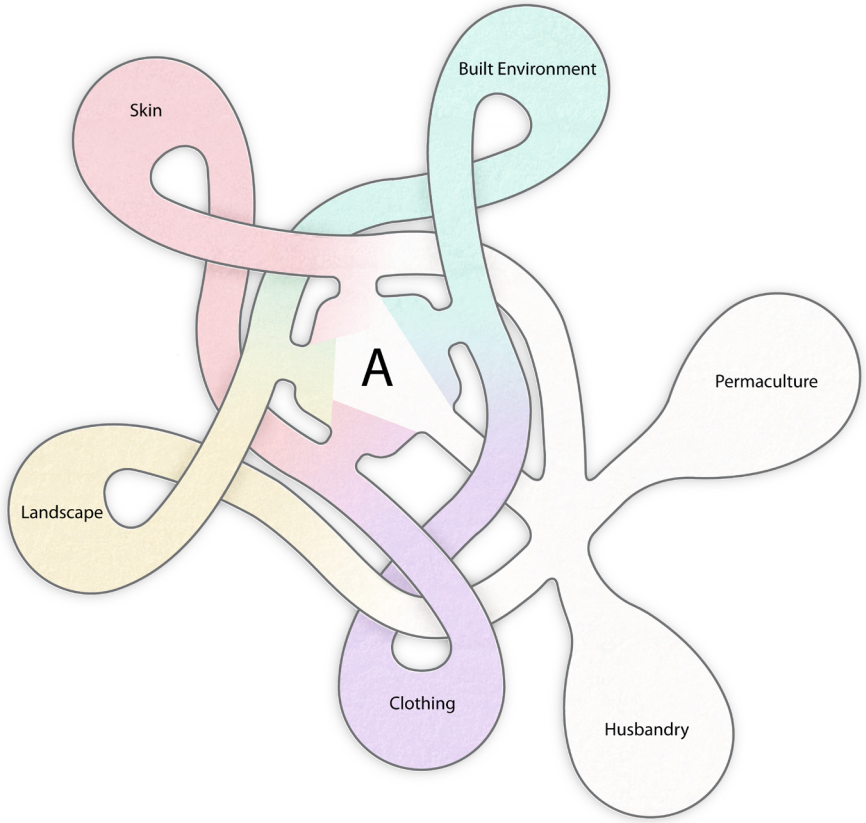


THE END

A video exploring life in 2080, following an individual's search fo a lost friend. The film examines other people's perspectives of this world, the various landscapes, habitats and individual aestheitcs therein.

Discusssions

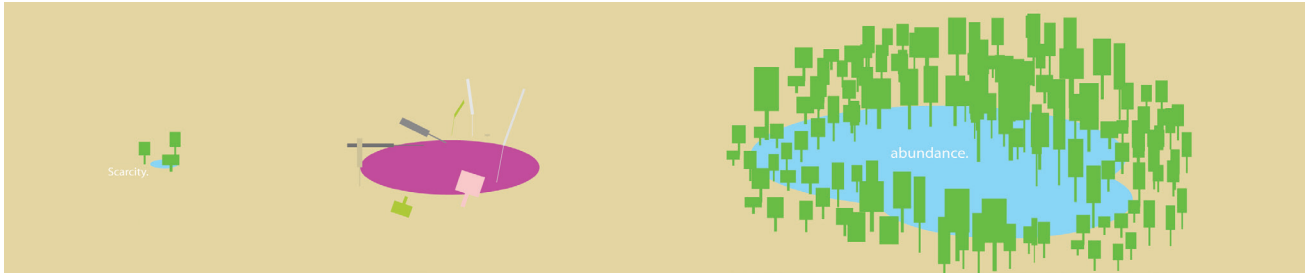
One could argue that it is through discussion that life is played out. An argument is presented, the notions are considered, then chosen, then acted upon. These internal and external discussions can be conducted in an instant or grappled with for a life time. Ultimately, this is how the future is determined, through the collective discussions and resulting actions of mankind.



As our physical world begins to lose significance, it will not cease to exist. Physical building and industry will slow until its resource dependency becomes infeasible.

Physical resource expenditure will be acutely selective.

At the intersection of skin, clothing, architecture and landscape is where our new architectonics will exist.

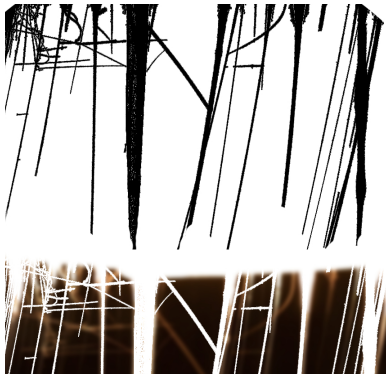


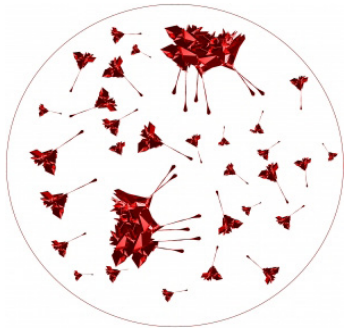
Husks

Animals build homes that are sustainable; they use the space that they need, and are efficient with materials. Once the homes are done with, they break back down ready to be reused. If animals built our homes around us, then we would become equally sustainable. Animals could not only build our homes but also gather food and supply warmth. Science at the moment is heavily researching biological mechanises and utilization of bio materials. Research and experiments into bio hacking indicate that soon we will be able to send out signals to animals, “programming” them to tend to our needs. In return we will offer them protection and warmth along with other benefits depending on the species.

So our thoughts are that, dependent on the geographic location of our physical selves, we will utilize local animals and organisms to create architecture for our bodies to moor within while we exist virtually.

These husks will protect us and provide symbiotic habitats for the creatures which construct them around us. They will be no less sustainable than the animals' natural existence is today and will degrade in the same way. We will be fed and nutritionally nourished through the husk. We will be inherently tied to the health of the surrounding ecosystem; the creatures, the husk and our health will be relative to the abundance or scarcity of local natural resources.
We will utilize synthetic signal transduction and pheromones to communicate with the husk-building organisms. Each will be controlled by an open source biological



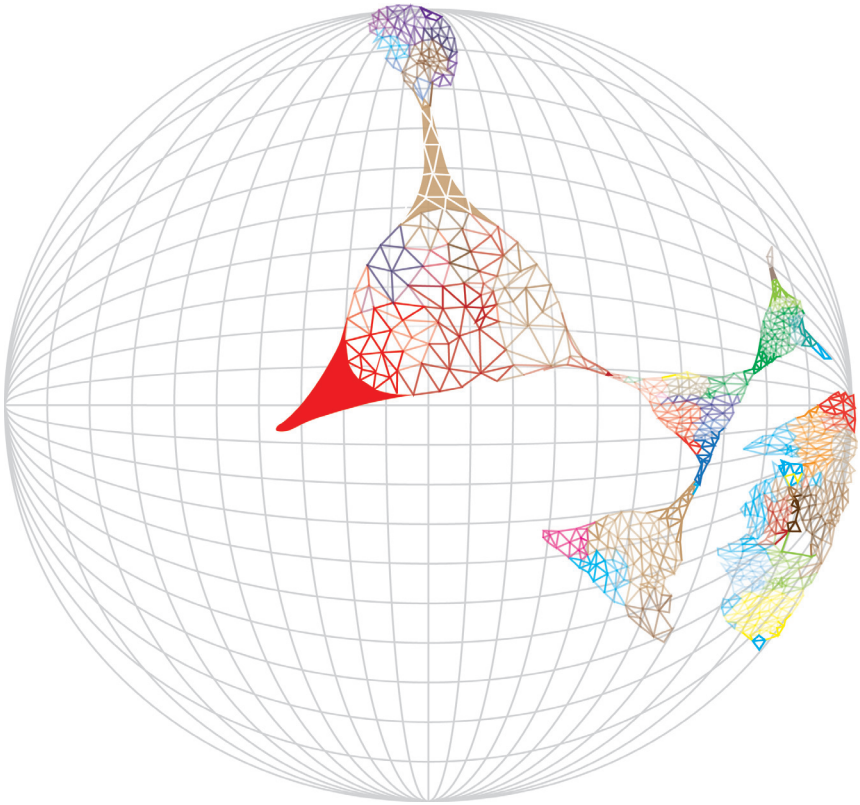


code which will be available for download, enabling universal and global access to a library of codes. It is likely that these bio-codes will evolve through democratic hacking and survival of the fittest. The appearance of the husk will reflect the bio-code used to create it, the health and abundance of the local ecosystem, and formal expressions of the inhabitant's virtual behavior. The codes will allow an exchange of expertise from cultures which are more advanced in sustainable animal husbandry and permaculture. The codes will also allow for universal and equal access even from disadvantaged populations.

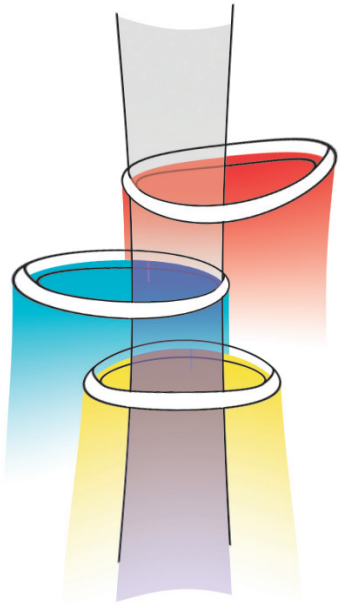
biological engineering

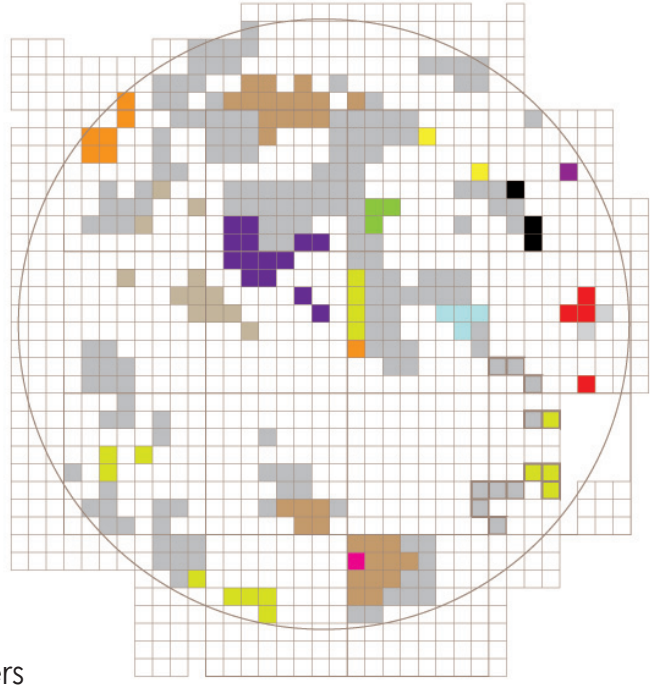
In 1950, the first engineered life form, ‘HeLa’, was constructed from cells harvested involuntarily from women named Henrietta Lacks. In 2001 the human genome was mapped and in May of 2010, the first truly synthetic engineered organism was manufactured using computer code and machines.

Where will this lead us?
With the intersection of code, engineering and biology, there is an inevitability that our ability to control nature will evolve similarly to the exponential nature of computing development and accessibility; perhaps to the extent of home engineering, or hacking, of nature. We will see organisms with specific task purposes, for example, bacteria which refines oil. Today we have the first generation of prototypes of nano-scale motors made from living organisms which are trained to flex and others which have been trained to move in herds.
Mankind is well practiced in prophesying its own future. Today’s science fiction does just that, however, the focus of sci-fi over the last century has arguably been one of ‘hard’ technology: flying cars, trips to space, robots etc. It seems sci-fi has failed on the most part to predict the sort of synthesis between the real, the virtual and the natural that we are beginning to see.



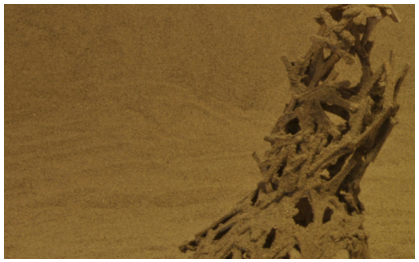
Mesh net works
As a global virtual platform causes geographic proximity to lose significance, concentrations of like-minded people will cluster into communities. These clusters will evolve into something analogous today the geography of today. A global platform has potential to further homogenise culture and identity unless protected by a system such as this.
Though the mesh network, individuals will also be encouraged to interact and communicate. For person A to get to person C they must make a connection with person B.





Information Pollution - Chinese Whispers

Just as in today's media, content will be influenced by the channels through which it flows. Cluster communities will draw information from their neighbors, rearranging and evolving as they democratically align themselves with appropriate clusters through which they receive streams of content. The culture and identity on which a cluster is based, will be shared with its neighbors just as it will be influenced by its neighbours.
Channels will be broken and grown within the infinity which is the virtual. Clusters of extremism will exist on the periphery of the platform while the spectrum bulges in the center with indifference. Information which travels from cluster to cluster will be muddied with perspective, content will be subtracted and added and arrives much like a chinese whisper at the other end

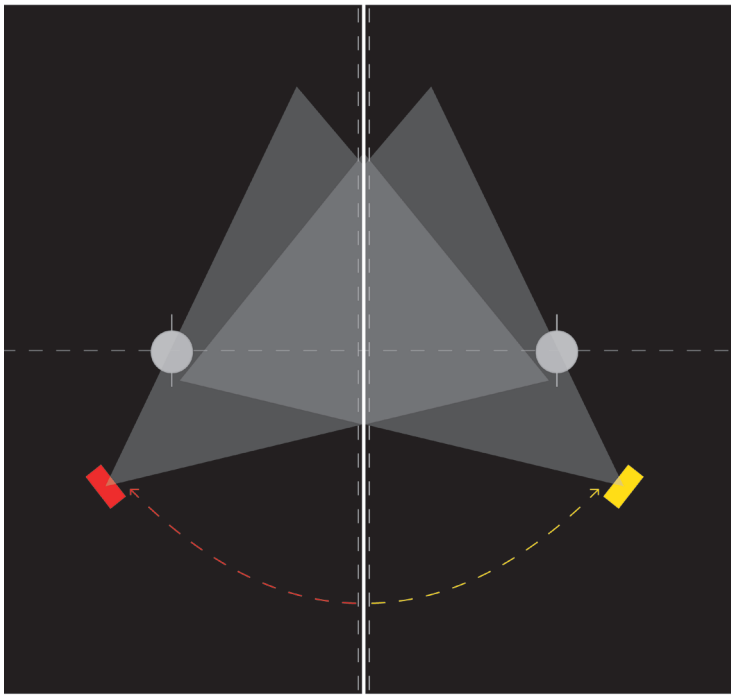

Social classes

Depletion of resources is the biggest predicament that our world faces. At this time a small proportion of us live well beyond the earth's means to support us. As developing nations try to 'catch up', the problem increases beyond restoration.

With open source bio-hacking and symbiotic relationships between humans and animals the waste of resources will decrease. With our need for possessions and excess met through the virtual, will the distinction between rich and poor fade?

Regrettably throughout history, there is always an element of a class system. Even without a lack of resources, it seems to be a part of human nature to distinguish between groups of people and repress the ones most different from your own. So how will classes manifest themselves in our proposed world?

Our suggestion is that the western world or "upper classes" will be repelled by animals and insects crawling on them. Due to this they will seek alternatives and instead of using animals they will design and pay for efficient robots or nanotechnology to tend to them. The distinction would be seen through the architectural aesthetic and the socio cultural patterns of the people using them. Fortunately this distinction only affects perceived standards of living not actual standards of living. All people are still housed and fed and have clean water. And if anything it is the "upper class" which is missing out on the beauty of the relationship.



Perspective

One man's ideal is not another's. For this reason, identity and content perception will be individualized. Our perspective of our contextual environments and each other's virtual identities will be governed by our individual and community values. We all say a strawberry is red, but the red that one person perceives may be completely different to another person. An environment in the virtual may contain the same content but will be perceived differently by those within it.

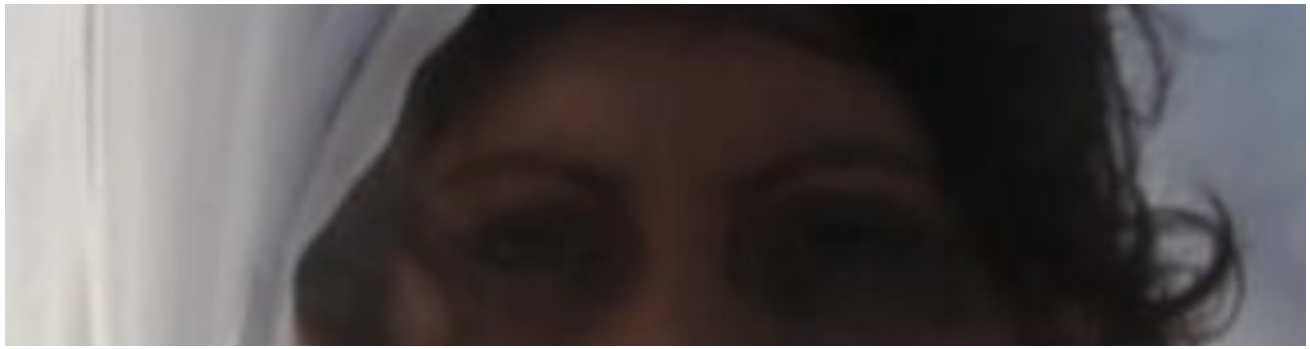
Childs life

How will children grow and develop? Will it be predominantly in the virtual or the physical? If their time is mainly spent in the virtual then their motor skills will not get developed and their brains will not understand the physical world in a coherent sense. Our conclusion is that the more than 50% of children's development should be in the physical world. This takes a large commitment from the parents as it would also require them to be in the physical. This time in the physical is important as it is during this time that the children orientate themselves and form understandings of natural life. It is important that this is done in the physical; if this is done in the unbounded virtual, then the limitations experienced in the physical would become hazardous. The physical environment also allows children to develop the ways in which they learn and creates an attachment to the physical world.

Learning

In the virtual, knowledge can be obtained and downloaded instantly; so how does this affect the way in which we learn? If the knowledge or skill is 'downloaded' as opposed to learned then while you are in the virtual it is always available to you. But as it has not been committed to memory through the brain's natural processes then it is not available to you in the physical. This has two consequences, it gives importance to the information that you 'learn', it is only the things important to you which you spend the time committing to your memory. It also means that there are two very different types of learning, and as one is easy, choosing to do the harder means the process of learning its self is valued, for some, learning could become a type of entertainment.

Proximity Value
When the necessities of today are no longer necessities, the rarity of the illogical begins to gain value. Faith, nostalgia, and physical proximity become luxuries.
The abilities of the virtual to provide function; instantaneity and efficiency will likely make the virtual a place for work and excess. Consequently the importance of one's collateral physical self and the sharing of proximity will gain importance.
The sensuality of physical sex or the participation in a physical meal, no matter its necessity, will appreciate in value; perhaps to the point where even sharing one's physical presence with another will appreciate into a sacred or erotic act.
It is not to say the physical will be more sensual, in fact it is much more likely that within the virtual one will experience even greater heights of ecstasy. The sensuality and intimacy in the physical will come through the sharing of imperfections. To co-habit with the persona and image which cannot be altered to suit, but is a fixture which has been given.



Morality

A law is only as good as our ability to enforce it.

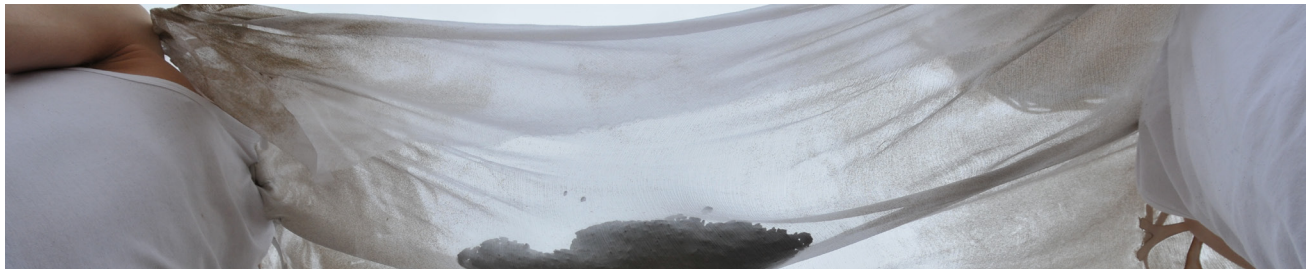
Rather than impose morality through law; democratic and individual judgment should be made on the basis of facts. It is necessary to bind peoples' physical and virtual identities so that that the two lives influence each other

Similar to the themes in Oscar Wilde's novel, "The Picture of Dorian Gray", the actions and indulgences of the individual in their virtual existence will be manifest in the physical. Behavior in the virtual which is destructive and infringes on others' liberties results in a change of the bio code which sustains our physical existence. This means that online behavior can be seen in physical health and in the up keep of surrounding 'architecture'.

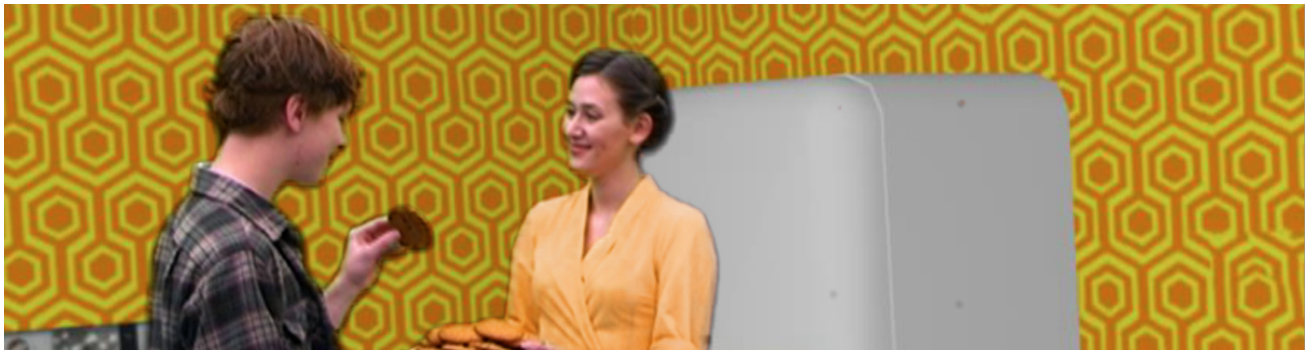
No one will be shielded by the anonymity and multiple identities which exist in today's internet. Physical existence, the one commonality we share, becomes our moral collateral.

A scenario to avoid:
Joystick soldiers; their actions online are murderous, while their physical identities enjoy wholsome family life after they clock off at 5 o'clock.

Nutrition
Our physical body needs sustenance, but not necessarily through the conventional act of eating. Already people are sustained through IV's, and emerging technology such as dermal patches are allowing people to absorb nutrients through the skin. Once the abstraction or creation of absorbable nutrients becomes more efficient, sustaining people directly without the wastes associated with food we will use much less of the earth's resources. This will allow for the planet to rejuvenate and support a much larger population.



Eating physically
Because eating and drinking are no longer necessities, the act of doing so becomes a type of entertainment. Because resources are precious and energy is no longer being put into producing food, sharing a meal with someone physically is very special, and a huge honour. Possibly like celebrating with a very expensive bottle of champagne.



Eating virtually

Our need to experience eating and satisfy our hunger, not our bodies need for nutrition, will be fulfilled virtually. Through the virtual we will experience more tastes than we do today as well as the feeling of the food in our mouths, or of eating too much. The possibilities of how we experience eating will become endless, and the visualization and experience of how we eat virtually is likely to morph to be unrecognizable yet incredible. These experiences will be actual experiences as they will be real signals that your brain is receiving, and real chemical responses that your body is making. If you are frightened by something that turns out to be harmless, does that make the fear response you experienced any less real? In the same way if your brain thinks that it is experiencing something, the responses that it sends out are equally as valid.

Entertainment

Currently, we spend most of our time working, so that we have the means to support our selves; with our necessities taken care of, time becomes free for entertainment. The question becomes how will people entertain themselves or others.

Computer day

Time becomes an interesting concept once we have no relationship to the sun or seasons. This can already be seen our society where electric lighting and communication technology allow people to work at all hours and at times entirely unrelated to the sun. However because of convention, safety, and transport, our society still references a conventional day. The question arises as to whether it is in fact more than this? Is there an inherent tie to a day that surpasses convention? Studies show that our tie to light is incredibly important to our circadian (internal) clock. At Cornell University, Scott Campbell and Patricia Murphy conducted a study which showed natural light in fact resets and helps govern our internal clock. The light research centre did a study proving that the lack of natural light in the morning delays the human sleep cycle. Physiologically our tie with natural sun light is strong and important for our physical health.

Through our discussions there was a feeling that there should parts of the physical world which break in to the digital one; this would create a tie to the individual physical location and community. Computing is moving to borrow and mimic biological systems. This could result in computers taking on the characteristics of plants. Just as plants are directly linked to the physical world and the physical day, the computers themselves will also be linked. Flowers close up at night; similarly computers may also do so, resulting in access points of the mesh net work closing and information pathways being harder to find, and encouraging people to come out of the virtual and experience the physical, adhering to a conventional day. Seasons will have a similar effect: in winter things will be slower and more relaxed; when spring comes, the virtual will accelerate. Since necessities are taken care of, slow times are not inconvenience,s just another state of being.

Death

If we can live virtually and have memories, knowledge and emotions, stored on line then do we really need our physical bodies? can we just carry on living virtually? Do we want to live forever? Will there be there a point when passing on is what we want? People talk about growing old and missing friends, and life not being the same. But if we don't grow old and our friends are still with us then we might want to live forever. Or will we just grow to the point where nothing is new anymore or we are just tired of new. If we do just carry on living without our bodies then where are we stored? This could cause a population problem, where people will keep getting born but no one will die.
Even with biological computing there is limited space. So when space runs out do the oldest just get deleted? Or do you just get an allocated amount of space and then choose which memories you keep or discard? Can you choose when you die?

The discussion of these questions seemed to have no conclusion as there were just too many plausible arguments and not enough information. However we did all find the idea of memories becoming public domain both interesting and agreeable. The memories, experiences, and perspectives of people who are dead or have just lived beyond a certain number of years, could become available to everyone. This would mean that you could explore people's lives, thoughts, and feelings. It would be similar to biographies today but much much, more immersive and personal.



Physical death

The symbiotic nature of the husk will continue even after we die..

In the case of honey-bees, for example, the bees will close the husk, remove our flesh piece by piece until they arrive at bone, when they will glaze it in antimicrobial Propolis and sterilize the hive. This is a phenomenon which happens today in hives.

The life of the hive will continue after the death of the human in this case

So as oeuf we have discussed, considered, and acted; it is now your chance to engage in our discussion and choose how you might act.

Throughout our investigation not only have we researched our topics through studies and literature, we have also contacted experts in the fields we have investigated. One of these was Dr Rachel Armstrong of The Bartlett School of Architecture and TED, an expert in the study and control of bio mineralizing photocells. We also contacted Benjamin Mathewson and Kate McGrath in relation to the same field. We have engaged in discussions with Dr. Johan Verbeek about the uses and potentials of blood plastic, and we have contacted Magnus Larsson expert in the sand-cementing bacteria, bacillus pasteurii We have also had extensive communication with various people in the bee cultivating industry, in relation to the behaviour and manipulation of bees.

In the majority of our material investigations, we went outside of New Zealand, importing silk from china, porcelain from Australia, and algae from America. This section covers some of the records we have of this communication.

Experts and correspondence

Fraunhofer Prof. Dr. Heike Mertsching—tissue growth
Heike.mertsching@igb.fraunhofer.de 29TH March
Contacted for a cooperation request; regarding human dermis material and Conceptual wearable architecture which triggers emotions.

Dr Rachel Armstrong-- bio-mineralisation
(of The Bartlett School of Architecture and TED.)
contacted regarding the plausibility of the sea husk

Dr. Johan Verbeek— Blood Plastic
Department of Engineering
University of Waikato
j.verbeek@waikato.ac.nz 19 Mar – 14 April.
Had ongoing email contact and a phone conversation.
Involved with plastics constructed from blood/biological
Protein. Discussing the potential of polymer. And NTP sheets.
Notes of conversation on Google Docs.

Magnus Larsson -cementing bacteria, bacillus pasteurii
www.magnuslarsson.com
contacted regarding the plausibility of the sand husk

Kate McGrath – bio-mineralisation
contacted regarding the plausibility of the sea husk

Julie Cox – bees
julie@steenshoney.co.nz
29/3 Emailed and had a personal meeting in Tauranga. And later another meeting with their Masterton team. Contact is on going
Wearable beeswax; created using a planar scaffold onto which the bees may create an extended structure of honeycomb.

Dr. Darren day. Stem cell research
darren.day@vuw.ac.nz 19 March email contact and telephone conversation.
Stem cell research.

Doug Eckery growing tissue
doug.eckery@vuw.ac.nz 24th March. Attended seminar and emailed.

Jeongbin Ok 3d printing blood plastic
jeongbin.ok@vuw.ac.nz
Sat, Apr 17, 2010 at 6:17 PM
Inquiring about using makerbots to print blood plastic

Robert – Silk
1st-silk@163.com. Contacted through email to purchase unprocessed, raw silk of which the caterpillars have been removed.

Previous DLF students.
Talked to two students asking for advice.

Dr Mironov—Bio Printing.
First contacted Mar 26 followed by a series of email conversations mironovv@musc.edu

Dear Kate McGrath,

I believe you may have participated in a lecture a couple of weeks ago at the Faculty of Architecture and Design. Or perhaps I'm confusing you with someone else. Regardless, I believe I also heard you in an interview on Radio NZ? We're part of a research paper at the VUW design school titled "Design Led Futures", co-ordinated by Ross Stevens. You can find more information and previous work at www.designledfutures.com.
Our team was particularly interested in your research and included bio-mineralisation as a part of our concept development. To be a bit more specific, our concept focuses on the use of animals and other organisms to create architecture. We are working with examples such as honey bees, silk worms, bacteria formed cement and of course, bio-mineralising protocells (pardon my lack of scientific knowledge).

We would like to justify our concept somewhat, although the fact that it is based on an a period 70 years from now makes this rather difficult. We have conducted experiments with bees which have yielded positive results, however our concept work including bio-mineralisation is less justified. We would appreciate it if you could write us a short statement which we could paraphrase into our report, regarding the potential viability of controlling bio-mineralising organisms in the far future. 2080 is of course a long way off and therefore anything is possible.

I appreciate your time. Please let me know as soon as possible if such a statement may be made.

Yours,
Jeremy Barribeau

Dear Magnus Larsson,

I am part of a team of fourth year honors students participating in a research paper titled "Design Led Futures", at the Victoria University of Wellington, New Zealand, Faculty of Architecture and Design, co-ordinated by Ross Stevens. Our research is very conceptual and our intent is to visualize future lifestyles approximately 70 years from now. The paper is being supported by Peter Jackson's Weta Workshop, most recognised for their work on the Lord of The Rings films.

One of our concepts we are to present shortly, implies the use of the sand-cementing bacteria, bacillus pasteurii, in creating sculptural architecture (pardon my lack of scientific knowledge). I believe you have similarly used these organisms in your "Dune" project. The sculptures are really more like wearable architecture, or 'husks' in which we dwell when interacting virtually. The sand concept is one of many different husks, each tailored to a particular geographic region.

We would like to justify our concept somewhat, although the fact that it is based on an a period 70 years from now makes this rather difficult. We are not a science faculty, and therefore justification is less crucial, however, we would like to qualify our concept a bit more than simply visualising it. We would greatly appreciate it if you could write us a short statement which we could paraphrase into our report, regarding the potential viability of using and controlling such cement-making organisms in the far future. 2080 is of course a long way off and therefore anything is possible....

We realise you must be very busy and appreciate your time. Please get back to us as soon as possible.

Yours,
Jeremy Barribeau

Dear Dr. Armstrong,

I am part of a team of fourth year honours students participating in a research paper titled "Design Led Futures", at the Victoria University of Wellington, New Zealand, Faculty of Architecture and Design, co-ordinated by Ross Stevens. (www.designledfutures.com)

Our research is very conceptual and our intent is to visualize future lifestyles approximately 70 years from now. The paper is being supported by Peter Jackson's Weta Workshop, most recognised for their work on the Lord of The Rings films. Our team was particularly interested in your research and included bio-mineralisation as a part of our concept development. To be a bit
more specific, our concept focusses on the use of animals and other organisms to create architecture. We are working with examples such as honey bees, silk worms, bacteria formed cement and of course, bio-mineralising protocells (pardon my lack of scientific knowledge).

We would like to justify our concept somewhat, although the fact that it is based on an a period 70 years from now makes this rather difficult. We have conducted experiments with bees which have yielded positive results, however our concept work including bio-mineralisation is less justified. We would appreciate it if you could write us a short statement which we could paraphrase into our report, regarding the potential viability of controlling bio-mineralising organisms in the far future. 2080 is of course a long way off and therefore anything is possible....

We realise you must be very busy and appreciate your time. Please endeavor to get back to us as soon as possible.

Yours,
Jeremy Barribeau

Expert response -Dr Rachel Armstrong (of The Bartlett School of Architecture and TED.)

Dear Jeremy,
What a very interesting project you're working on. Please let me know how this all goes - I'd be intrigued to see what you come up with!!
I have no idea what the context is that you're using this in and I won't write much as I am in the middle of something else ... but if I don't respond now then I will simply not write anything at all ....

BIO/MINERALIZATION

Traditionally, architecture works with a top down approach to construction. Architects use a blue print to inform the implementation of a design intention, rather like the way DNA has been given hierarchical importance in directing the form of an organism. Since the materials used in the construction of modern architecture are 'inert' - in other words they have no innate living qualities - the energy required to assemble the building blocks is immense (Building Design online reports that building construction processes currently constitute 6 to 10 percent of a building's carbon footprint and in the next 10 years this is set to climb to 25%).

Living systems. Working through the coordinating chemical molecule DNA, go about their construction process differently. They take a bottom up approach using local resources creatively through the chemical transformation of available material. Living systems convert these substances through the process of metabolism into substrates for construction purposes that are uniquely adapted to a particular environment.

For any structure to maintain integrity within an environment scaffolding has to be laid down. This does not have to be permanent and as in the case of bone,

can be remodeled. The process through which soft matter becomes firm is called mineralization. This takes place through both organic and inorganic methods. Organic mineralization requires the application of a biological metabolism to convert raw materials, such as carbon dioxide and food into precipitates that are organized by the interactions of cells. These cells may individual bacteria working as a colony or exist as specialized agents within the tissue landscape of a multiceullar organism.

Inorganic mineralization typically happens during the process of fossilizations where an organic matrix is replaced by a more stable inorganic one through a dynamic set of complex chemical interactions.

Both of these approaches engage with dynamic interactive chemistries that result in the transformation of distributed resources into an intentionally orchestrated (design led) construction process and can be thought of as a form of material computing where the parallel processing power of chemistry provides the agency for decision making in the design process.
The role of the designer in this context is to understand both the software (chemical interaction) and the hardware (materials) sufficiently to know how to communicate with an influence the process. Unlike digital computing which is massless, chemical computing possess weight, operates within 'real' space and is subject to the passage of time.

In this way chemical computing (whether conducted by organisms or artificial systems) can provide an alternative way of generating design outcomes for the construction of architecture.

Dr Mironov—Bio Printing.
From: Stuart Munro <s.g.munro@gmail.com>
Date: Fri, Mar 26, 2010 at 12:31 PM
To: mironovv@musc.edu

Dear Dr Mironov,
I'm part of a team from Victoria's School of Architecture and Design in New Zealand
studying some rather far-out concepts in futurism.

Previous work may be found on this site:
http://designledfutures.com/

I am interested in the ideas surrounding bio printing and building living biological matter in a lab environment and how this can be utilised in the future of design.

I realise you are most likely very busy, But I would greatly
appreciate the chance to have a chat with you regarding some
conceptual work.

Yours,
Stuart Munro

From: Mironov, Vladimir <mironovv@musc.edu>
Date: Fri, Mar 26, 2010 at 12:57 PM
To: Stuart Munro <s.g.munro@gmail.com>

my phone is 843-792-7630

Vladimir Mironov

From: Stuart Munro [s.g.munro@gmail.com]
Sent: Thursday, March 25, 2010 8:31 PM
To: Mironov, Vladimir
Subject: Bio printing research

From: Stuart Munro <s.g.munro@gmail.com>
Date: Fri, Mar 26, 2010 at 1:38 PM
To: "Mironov, Vladimir" <mironovv@musc.edu>

Hi,

Thanks for your response, as i am in New Zealand, i feel contact by email will be more appropriate, at least for now.
How do you feel about a skype meeting sometime in the next coulpe of weeks? this will allow us to prepare some more work to share with you
and think more about the kinds of things we could discuss.

Thank you,
Stuart Munro

From: Mironov, Vladimir <mironovv@musc.edu>
Date: Fri, Mar 26, 2010 at 1:40 PM
To: Stuart Munro <s.g.munro@gmail.com>

My skype code is mironovv1
but I am experiencing some problem to restarted my skype service.
I hope that problem will be solve soon
meantime you can read my paper there is a lot information about bioprinting on internet and Pubmed.
See for example recent issue of new journal "Biofabrication" with our report on Bioprinting meering in France in 2009
It can give a sense in what direction bioprinting community is moving and what are our dreams.
See also my paper in the same journal "Biofabrication as XXI manufacturing paradigm"

Vladimir
Sent: Thursday, March 25, 2010 9:38 PM
To: Mironov, Vladimir
Subject: Re: Bio printing research
From: Stuart Munro [s.g.munro@gmail.com<mailto:s.g.munro@gmail.com>]

Fraunhofer Prof. Dr. Heike Mertsching—tissue growth

From jb <jedbar@gmail.com>
To eike.mertsching@igb.fraunhofer.de
Date 29 March 2010 15:50
subject Cooperation Request

To Whom It May Concern:

We are a team of industrial design honors students from Victoria University of Wellington, School of Architecture and Design in New Zealand

Our focus is on developing prospective future lifestyle at about 50 years from now. Some of our concepts are radical and difficult to conceptualize. It is for this very reason that our work requires interdisciplinary support from scientific and technological innovators such as yourselves.

Some of our previous work may be found at:
Designledfutures.com

Currently we are working alongside Weta Workshop (Peter Jackson's company, most widely recognised for their film production, Lord of the Rings).

For years now, I have been following the developments of In Vitro tissue and organ manufacturing. I believe, from my rather limited technical understanding, that your organisation has one of the most advanced production-ready processes for human tissue manufacturing.

I am very passionate about your work and would love to have the opportunity to discuss with you the possibility of creating a prototype human dermis material (for purely conceptual and research purposes). Ideally we would be able to send you an appropriate biopsy sample from which a specimen may be manufactured?
As the purpose of the material sample is not for medical use, the priority would be maximum cell growth or size as opposed to medical safety/bio-compatibility.

What's the reason for this request?
We are creating conceptual objects based on the concept of mooring one's body while spending more time in a virtual existence. We believe that objects which already have an inherent relationship with the body, provide greater compatibility with one's emotional response and trigger feelings such as nostalgia. We would like to create a wearable architecture (for example, a garment) which triggers such emotions.

A great example of science and industrial design interdisciplinary cooperation may be found at:

http://www.biojewellery.com/
http://gow.epsrc.ac.uk/ViewGrant.ASPx?Grant=GR/T26511/01&bannerlink=Programme%20support

Please let me know if there is potential for cooperation on this project. Our time frame for this research is from now until June 22
2010.

Yours,
Jeremy Barribeau
+64273817777
--

Julie Cox – bees

From jb <jedbar@gmail.com>
To julie@steenshoney.co.nz
Date 29 March 2010 14:50
Subject Research Request

Hi Julie,
Thanks for taking the time to speak to me earlier today.

our website is:
http://designledfutures.com/

and the precedent honeycomb work may be found at:

http://www.moma.org/interactives/exhibitions/2008/elasticmind/#/275

http://www.inhabitat.com/2007/04/24/vase-made-by-bees-by-studio-libertiny/bee-vase-vase-made-by-bees-beeswax-vase-dutch-design-dutch-design-vase-studio-libertiny-thomas-gabzdil-libertiny/

So, in summary, at this stage we would like to create a planar scaffold onto which the bees may create an extended structure of honeycomb. The form it will take will most likely be something wearable - like a garment or shroud.

Let me know what you think and feel free to contact me should you require any more info. I will also be in Tauranga (where I believe you are based) from Thursday 1 April to Tuesday 6, if a personal meeting is necessary.

Cheers,
Jeremy Barribeau
School of Architecture and Design
Victoria University of Wellington
139 Vivian Street
Te Aro 6011
Wellington
New Zealand

Julie Cox to me 29 Mar

Hi,

This sounds great we are happy to help. We are keen to meet and discuss it further

on the 6th April, the head office is at 376 Reid Road, R D 7, Te Puke. It is actually off Welcome Bay road only 5 mins from Fashion Island.

Kind Regards,
Julie

jb to Julie 13 Apr

Hi Julie

Thanks for taking the time to meet with me last week.

Have you contacted Carlos in Masterton yet regarding our discussion and access to the facility there?

I would love to get in contact with him asap so we can start construction of the experiment. Perhaps I could call him after you've had a word with him?

Cheers
Jeremy Barribeau

0273817777

Dr. Darren day. Stem cell research

From jb <jedbar@gmail.com>
To darren.day@vuw.ac.nz
Date 19 March 2010 12:42
Subject enquiry

Hi Dr. Day,

I'm part of a team from Victoria's School of Architecture and Design studying some rather far-out concepts in futurism.

Previous work may be found on this site:
http://designledfutures.com/

Earlier today we attended a seminar by some postgraduate student on the topic of stem cell research (supervised by Doug Echery). When I asked him for some information on tissue engineering, he recommended I speak to you, as he felt your research may be relevant.

I realize you are most likely very busy, But I would greatly appreciate the chance to have a chat with you regarding some conceptual work.

Yours,
Jeremy Barribeau
0273817777

Doug Eckery growing tissue

From jb <jedbar@gmail.com>
To doug.eckery@vuw.ac.nz
Date 19 March 2010 11:43

Hi Doug,
Thanks for letting us sit in on today's seminar.Here is the website for previous DLF workhttp://designledfutures.com/dlf2009/index.html

Cheers, Jeremy Barribeau Robin Mack

From Doug Eckery <Doug.Eckery@vuw.ac.nz>
To jb <jedbar@gmail.com>
Date 24 March 2010 08:33
Subject RE: Hi from Industrial design students

Hi Jeremy and Robin,
Sorry for the delay in responding, but for some reason your email was sent to my junk email folder which I've just discovered.
I'm glad you came along to the seminar and I hope it was helpful to you.

Regards,
Doug

Jeongbin Ok 3d printing blood plastic

Robin Mack <robin.james.mack@gmail.com> Sat, Apr 17, 2010 at 6:17 PM
To: jeongbin.ok@vuw.ac.nz
Hello Jeongbin.
I am a fourth year industrial design student. I think we may have spoken to each other at some point but I am unsure. Tiago has told me that you have been speaking to some people from Victoria's chemistry department who have a plastic extruder able to make some filament which could potentially be used with Tiago's makerbots.
The reason I am emailing you is that we are aquring a small amount of 'blood plastic' (http://sci.waikato.ac.nz/farm/curriculum/technology.html) from an academic at the University of Waikato named Johan Verbeek. We are interested in making 3d prints with the makerbot for Ross' Design Led Futures Paper in the

near future. We really need to quickly demonstrate that we are able to process the material so that Johan will send us more than just a sample and potentially process some of our own blood so that we can make far more personal objects.
If you would be able to help us out with this we would be very grateful.
Thank you very much Robin James Mack.

Dr. Johan Verbeek— Blood Plastic

To j.verbeek@waikato.ac.nz
Date 28 April 2009 09:43
Subject interested student....

Dear Dr. Verbeek,

I recently read the article in stuff regarding your research. (http://www.stuff.co.nz/national/farming/464935)
I'm an Industrial Design Student at Victoria University. I'm currently working on a concept (and rather abstract) mp3 player which I'm using as a platform to push the use of natural animal products in consumer electronics. My material research has included for instance, horse hair, salmon skin and sheep intestine. The body of the device is currently made out of a rapid prototyped or stereolithographed resin material. However I would like to propose in my documentation that this main component be made from a bio-plastic from a local source. I understand that your research may be confidential and your time valueable.... I would really appreciate however, an email in which you could state the basic material process and manufacturablilty of animal protein plastic in tradtional injection-moulding facilities.

I really appreciate it,
Cheers,
Jeremy Barribeau

Johan Verbeek to me 29/04/2009

Dear Jeremy,

Thanks for the interest. The material we are working with can easily be injection moulded in standard plastic injection moulders, but I would advise on using this material just yet. There are a few issues regarding use for consumer products that would make it unsuitable at this stage. The main reason is an odour to the plastic that makes it unattractive for applications other that agricultural type products. In future we hope to solve this problem which will then make it much more applicable.

Hope this helps

Dr. Johan Verbeek
Department of Engineering
University of Waikato

+64 7 838 4947 (office)
+64 7 838 4835 (fax)
http://www.eng.waikato.ac.nz/research/comps/

From: Jeremy Barribeau [mailto:jedbar@gmail.com] Sent: Tuesday, 28 April 2009 9:44 a.m. To: j.verbeek@waikato.ac.nz Subject: interested student....
- Show quoted text -

Dr, Verbeek,

I emailed you last year in April regarding your research into plastics (more specifically plastics constructed from blood/biological protein). I appreciate your reply, which entailed that the technology was not yet ready for product design applications.

We are currently working in teams to conceptualise anthropology, design and technology in the coming 50 years. Previous work may be found at: http://designledfutures.com/

I've kept your work in mind ever since first reading about it. I would greatly appreciate the chance to chat to you regarding some fairly far-out (noncommercial) concepts.

Yours,
Jeremy Barribeau

0273817777
Industrial Design Department
School of Architecture and Design

Johan Verbeek to me show details 19 Mar
Dear Jeremy,

Sure, I'd be happy to.

Regards

Dr. Johan Verbeek
School of Engineering
University of Waikato

jb to Johan 22 Mar

Excellent, thanks.

Would you be available tomorrow for a phone call? What time would be best?

-Jeremy Barribeau

Johan Verbeek to Darren, me 22 Mar
Hallo Jeremy,

I'll be happy to chat with you tomorrow at 9:30am. I would be grateful if you could also talk to Darren Harpur as well, as he is the venture manager from WaikatoLink (07 838 4232 or dharpur@waikatolink.co.nz).

Regards

Dr. Johan Verbeek
School of Engineering
University of Waikato

jb to Johan 29 Mar
Hello Johan,

We spoke last week regarding your materials research work and thepotential for some informal cooperation between our disciplines....

We will be rapid prototyping some forms shortly and would like to incorporate proof of your technology. Would it be possible to attain some of the 'powder' or chemical additive into which we may add blood meal or blood?
We would appreciate it greatly. Also, you have it in good faith that we do intend to compete, nor operate within the same field. This is merely conceptual design work

with no commercial benefit.

We would also be happy to share any imagery we create.

Thank you, I appreciate your help.

Cheers,
Jeremy

Johan Verbeek to me 31 Mar

Hi Jeremy,

Would love to help, but I don't have any that is prepared at the moment. The material has to be injection moulder in order to get it into any form or shape.

What sort of rapid prototyping are you referring to, and what did you have in mind in terms of incorporating the plastic with what you are doing?

I could have some prepared, if it looks like it could work...

Dr. Johan Verbeek
School of Engineering
University of Waikato

jb to Johan 11 Apr (6 days ago)
Hi Johan,

Thanks for your prompt reply and apologies for my belated reply. I would also like to thank you for your willingness to help and advise us on this project; we really appreciate your time.

We would like to illustrate the potential of your polymer in a variety of 'sculptural' mockups. It is hard to understand the material without hands-on experience (and a bit of a play). For example, we would like to strengthen some long matted human hair with it (as though it had been dipped and coated with resin) - this may or may not be possible,
so first we would experiment and if unsuccessful, we would create a staged mockup of what we intended to happen.

Also, another experiment we've conjured up, is engineering a scaled-up human hair and follicle which will be rapid prototyped on an objet 3d-printer (examples of prints may be seen at
http://firstyeardesign.com/index.php?/pages/dsdn104gallery/)
we may also create a prototype with which we could hypothetically tap blood into a mold which would directly result in a polymer object.

Please let me know your thoughts,
We would like to begin experimenting as soon as possible.
Johan Verbeek to me 14 Apr (3 days ago)

Hi Jeremy,

We would like to illustrate the potential of your polymer in a variety of 'sculptural' mockups. It is hard to understand the material without hands-on experience (and a bit of a play). For example, we would like to strengthen some long matted human

hair with it (as though it had been dipped and coated with resin) - this may or may not be possible,
so first we would experiment and if unsuccessful, we would create a staged mockup of what we intended to happen.

>>> Would be hard to do this as the material cannot be dissolved to allow you to "dip" anything in it. If I understand correctly, you would like each individual hair to remain separate? If you wanted to make a sheet of human hair, where it is used as fibre, then you may have a
shot. You could for instance, place hair on a sheet of bloodmeal polymer (called NTP or Novatein Thermoplastic Protein) and then press it while you are heating it up. But I got the impression that this is not what you wanted.

Also, another experiment we've conjured up, is engineering a scaled-up human hair and follicle which will be rapid prototyped on an objet 3d-printer (examples of prints may be seen at
http://firstyeardesign.com/index.php?/pages/dsdn104gallery/)

we may also create a prototype with which we could hypothetically tap blood into a mold which would directly result in a polymer object.

>>> Would be nice if you had the mould, but once again, you need a method of getting the material into the mould. NTP has to be heated to 120C and the injected into any mould under pressure.

The best I can do is probably send you a couple of NTP sheets to playwith. Remember it smells and is not really intended to be used for what you are doing. Let me know how you would like to proceed.

Cheers
Johan

Previous DLF students
feedback from dlf student 1 (2009) and 2 (2008)
1. starts
screw 3d animation.
make it look real
real models, good photography, believable shit, human, so people (audience) can relate to it.
no point in going far out in the future imagining random shit, based on technology - designing an ideology is more relevant.

2. start to kick in too..
Look at imagery. Make imagery.
Look at Emily's project - listen to her.
Look at the future as if it was passed - Maxe's quote
Start straight away to play with visual tests.

1. get's annoyed and doesn't wanna think about dlf...
DLF is a chance for a design student to design without the limits and preconceptions of the contemporary world. It's a chance you probably wont get again.
See "the future" as a metaphor for design. Design is always about "what is to become".
Work with a topic of your personal interest, keep yourself interested.
This, I (2) found, can happen if the group creates a group philosophy that all can relate to.
Personally, (2) I would work from clothing.

But for you - make sure you work from your personal interest, and everyone in the group needs to find something they passionately relate to within the philosophy. By the individual projects growing the philosophy will strengthen.

Talking is important, without getting lost in chatty meetings. But sharing the projects, talking through work and experiments.

1. now calmer says
Important to have fun, not take it to serious. For ID - make a series of objects that symbolise ideas related to the ideology of the group. Create something for a portfolio.
Make cool shit for your portfolio, use the time well so the course is useful for you.
Absurd.
Millions of mores later.

Ian Bowell—firing porcelain

From: Helen Andreae [mailto:helenandreae@hotmail.com]
Sent: Thursday, 15 April 2010 9:10 a.m.
To: Ian Bowell
Subject: porcelain firing

Hi Ian,
I spoke to you yesterday about firing a Keraflex piece. I just wanted to check that it was still ok to come by this morning.
regards
Helen Andreae

From: Ian Bowell (Ian.Bowell@vuw.ac.nz)
Sent: Wednesday, 14 April 2010 9:28:01 p.m.
To: Helen Andreae (helenandreae@hotmail.com)

Hi Helen
Yes it is fine to come in this morning. Give me a ring to sort out time.
Ian

Robert – Silk
Robin Mack <robin.james.mack@gmail.com> Thu, Mar 25, 2010 at 10:37 PM
To: 1st-silk@163.com
Hello and good day.

My name is Robin Mack, I am a design researcher from the Victoria University of Wellington in New Zealand. I am interested in obtaining some unprocessed, raw silk of which the caterpillars have been removed. I would prefer the silk to be at the stage of production pictured in the attached photograph. I look forward to your reply.

Thank you.

Robin James Mack.

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robert <1st-silk@163.com> Sat, Mar 27, 2010 at 1:46 PM
To: Robin Mack <robin.james.mack@gmail.com>
Dear Robin,
Thank you for your early reply.
Would you please tell me how many kilos do you want to order in order that I could give you the quotation?
Waiting for your early reply.
Best wishes
Robert

Robin Mack <robin.james.mack@gmail.com> Sat, Mar 27, 2010 at 4:09 PM
To: robert <1st-silk@163.com>
Hello again Robert.

Thank you for your quick reply.
How much would only one kilo cost? Would you also be able to send me a photogarph of the product you would be sending to me?

Thank you again.
Robin Mack.
2010/3/27 robert <1st-silk@163.com>

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robert <1st-silk@163.com> Mon, Mar 29, 2010 at 2:41 PM
To: Robin Mack <robin.james.mack@gmail.com>
Dear Robin,
Thank you for your early reply.
We don't have the photos. However, I've already know which items do you want to order.
If you want to order one kilo, the price is RMB500.
Waiting for your early reply.
Best wishes
Robert

Relevant literature which helped inspire and guide us, along with a few that are just plain buzzy.

Physical Anonymity

This is a proposition that in future, online / virtual profiles will become less and less anonymous. Information regarding each individual will be given and accessed freely in order to function in society. This could be similar to how it is not compulsory to have a bank account but it is necessary.

Nameless in cyberspace
Wallace, J. D. (1999). Nameless in Cyberspace Anonymity on the Internet. New York: Cato Institute.

On the internet nobody knows you're a dog
Christopherson, K. M. (2007). The positive and negative implications of anonymity in Internet social interactions: "On the Internet, Nobody Knows You're a Dog. Computers in Human Behavior , 23 (6), Pages 3038-3056.

Blogger ethics
Kuhn, M. (2007). Interactivity and Prioritzing the Human: A Code of Bloggin Ethics. Journal of mass Media Ethics , 22 (1), 18-36.
Hitlab (source of experts)
hitlabnz. (2009). hitlabnz. Retrieved March 2010, from COSC426: http://www.hitlabnz.org/wiki/COSC426

Augmented Reality through wearable computing
Starner, T., Mann, S., Rhodes, B., & Levine, J. (1997). Augmented Reality through wearable computing. Cambridge: M.I.T Media laboratory .
Archaeology
– learning their language and perspective

An Experiment in Archaeology

Bonnichsen, R. (1974). Millie's Camp: An Experiment in Archaeology. World Archaeology , 4 (3), 277-291.

Troy in Recent Perspective

D. F. Easton, J. D. (2002). Troy in Recent Perspective. Anatolian Studies , 52, 75-109.

The Knower and the Artificer

David, .. A. (1987). The Knower and the Artificer. American Quarterly , 39 (1), 37-55.

Hermeneutics and Archaeology

Olsen, H. J. (1992). Hermeneutics and Archaeology: On the Philosophy of Contextual Archaeology. American Antiquity , 57 (3), 419-436.

New Evidence for the Origins of Textile Production

Webb, J. M. (2002). New Evidence for the Origins of Textile Production in Bronze Age Cyprus. Antiquity , 76, 364-71.

Biomineralization

The Formation of Protocells and Their Structural Components

Kostetsky, E. Y. (2005). The Possibility of the Formation of Protocells and Their Structural Components on the Basis of the Apatite Matrix and Cocrystallizing Minerals. Journal of Biological Physics , 31 (3-4), 607-638.

Tissue Development

Tissue Engineering on Demand

Fraunhofer IGB. (2009). Automated Tissue Engineering on Demand. Stuttgart: Fraunhofer IGB.

Organ-like three-dimensional test systems

Fraunhofer Institute for Interfacial Engineering and Biotechnology IGB. (2009). Organ-like three-dimensional test systems Alternatives to animal testing. Stuttgart: Fraunhofer IGB.

Biofabrication: a 21st century manufacturing paradigm

Biofabrication is a broad term encompassing engineering biological things from raw or semi-finished material.

This article talks about many forms of biofabrication such as; solid scaffolding based, embedding and moulding, cell sheet technology, organ printing, digital bioprinting, inkjet bioprinting, biospraying and more.

It also covers the advantages and disadvantages of the different types of biofabrication and outlines the most promising techniques for specific outcomes.

Interestingly, one of the most promising techniques is inkjet bioprinting which is based on current 3d printing techniques, inkjets bioprinters are relatively cheap and affordable which makes it an attractive technology. This form of biofabrication is also promising due to the solid base of current inkjet printer companies such as Canon, Hewlett Packard and Lexmark.

The article outlines some interesting and less obvious uses for biofabrication such as animal–free meat production and more common uses such as organ printing for transplants.

Most interesting it the process of inkjet bioprinting as it shows great potential with a well grounded base in existing technologies as well as high accuracy and programmability.

Mironov, V., Trusk, T., Kasyanov, V., & Little, S. (2009). Biofabrication: a 21st century manufacturing paradigm. IOP Publishing.

The Importance of aesthetic experiences
– How we sense and can we control it?

Mapping Aesthetic Experiences
White, B. (1998). Aesthetigrams: Mapping Aesthetic Experiences. Studies in Art Education , 39 (4), 321-335.
Aesthetic Perception and Human Understanding

Newman, A. J. (1972). Aesthetic Perception and Human Understanding. Studies in Art Education , 14 (1), 3-7.

Skin Deep or In the Eye of the Beholder
Zangwill, N. (2000). Skin Deep or In the Eye of the Beholder?: The Metaphysics of Aesthetic and Sensory Properties. Philosophy and Phenomenological Research , 16 (3), 595-698.

Controlling animals

Controling the behavour of fowls
L. M. MCQUOID & B. G. GALEF, J. (1993). Social stimuli influencing feeding
Using slime mould to map transportation paths
Barribeau, T. (2010, January 38). What Slime Molds And Subways Have In Common, According to Scientists. Retrieved March 28, 2010, from io9: http://io9.com/5452969/what-slime-molds-and-subways-have-in-common-according-to-scientists
properties and aplications of spider silk
Davis, L. (2009, September 24). A Cloth Stronger than Kevlar, Made by a Million Spiders. Retrieved March 29, 2010, from io9: http://io9.com/5366589/a-cloth-stronger-than-kevlar-made-by-a-million-spiders

Bees

Beekman, M., Sumpter, Seraphides, & Ratnieks. (2004). Comparing Foraging Behaviour of Small and Large Honey-Bee Colonies by Decoding Waggle Dances Made by Foragers. Functional Ecology , 18 (6), 829-835.

Byers, G. W. (1959). An Unusual Nest of the Honey Bee. Journal of the Kansas Entomological Society , 32 (1), 46-48.

Greenberg, L. (1982). Year-Round Culturing and Productivity of a Sweat Bee, Lasioglossum zephyrum(Hymenoptera: Halictidae). Journal of the Kansas Entomological Society , 55 (1), 13-22.

Greggers, U., & Menzel, R. (1993). Memory Dynamics and Foraging Strategies of Honeybees. Behavioral Ecology and Sociobiology , 32 (1), 17-29.

Isack, H. A., & Reyer, H.-U. (1989). Honeyguides and Honey Gatherers: Interspecific Communication in a Symbiotic Relationship. Science, New Series , 243 (4896), 1343-1346.

Janmaat, A. F., Winston, & Ydenberg. (2000). Condition-Dependent Response to Changes in Pollen Stores by Honey Bee (Apis mellifera). Behavioral Ecology and Sociobiology , 47 (3), 171-179.

Lawler, L. B. (1954). Bee Dances and the "Sacred Bees". The Classical Weekly , 47 (7), 103-106.

Moore, D., Angel, Cheeseman, & . Fahrbach, G. (1998). Timekeeping in the Honey Bee Colony: Integration of Circadian Rhythms and Division of. Behavioral Ecology and Sociobiology , 43 (3), 147-160.

Pankiw, T., Page, & Fondrk. (1998). Brood Pheromone Stimulates Pollen Foraging in Honey Bees (Apis mellifera). Behavioral Ecology and Sociobiology , 44 (3), 193-198.

Robinson, F. A., & Nation. (1966). Artificial Diets for Honey Bees, Apis mellifera. The Florida Entomologist , 49 (3), 175-184.

Seeley, T. D. (1994). Honey Bee Foragers as Sensory Units of Their Colonies. Behavioral Ecology and Sociobiology , 34 (1), 51-62.

Seeley, T. D., Kühnholz, & Weidenmüller. (1996). The Honey Bee's Tremble Dance Stimulates Additional Bees to Function as Nectar Receivers. Behavioral Ecology and Sociobiology , 39 (6), 419-427.

Senses
– relating to how we experience the world and augmented reality
The hidden sense: Synesthia in art and science

Examples of synesthia, when two of more senses co-operate in perception, are hearing music in colours, seeing letters as a colour, hearing something after looking at an image.

Campen, C. V. (2008). The Hidden sense. Cambridge: Massachusetts Institute of Technology.

The human body.

The book covers everything; biology of the cell, genetics and evolution, tissues, the musculoskeletal system, the blood and vessels, all our systems reproductive, respiratory, and sensory systems. the chapters on our senses was interesting it covered the eye and the skin and how they relate to our senses.

Fuller, A., & Schuenke, M. (2004). An Introduction to Structure and Function". New york: Georg Thieme Verlag.

How the eyelashes could alert the user to danger.
http://www.applesnail.net/content/anatomy/senses.php date accessed 10/3/10

Eyelash implants

Eyelash transplant, in which hair from the back of the patient's head is grafted on to the eyelid to give long, thick lashes.
http://surgerylowdown.blogspot.com/

Using procedures pioneered by the hair loss industry for balding men, surgeons are

using “plug and sew” techniques to give women long, sweeping lashes..
http://www.msnbc.msn.com/id/15412176/

Synthetic Eyelashes lengthen and thicken your lashes using single strands of synthetic fibbers that are shaped to look like real eyelashes.
http://www.ceydeli.com/procedures/face/hair.php

The power of faith in referecnce to objects

Cobb, J. B. (1994). Faith. Buddhist-Christian Studies , 14, 35-41.
Russell, P. W. (1971). Proximity and Interactional Behavior of Young Children to Their “Security” Blankets. Child Development , 42 (5), 1575-1579. comfort fath what it provides

The practice of design, and spacial construction

William Godwin, P. M.-C. (1997). Objects in transition: A Spatial Paradigm for Creative Design. Leonardo , 30 (4), 319-325. design practice and spacial construction

Cultural based commonality and identity in relation to language. Looking at the significance of using different regions, also relating aspects back to the Hadza.

Colby, B. N. (1966). Ethnographic Semantics: A Preliminary Survey (and comments and replies). Current Anthropology , 7 (1), 3-32.
Lenneberg, E. H. (1953). Cognition in Ethnolinguistics. Language , 29 (4), 463-471..
Haza and commonality lang
Rowe, J. C. (2004). Culture, US Imperialism and Globalisation. American Literary History , 16 (4), 575-595.