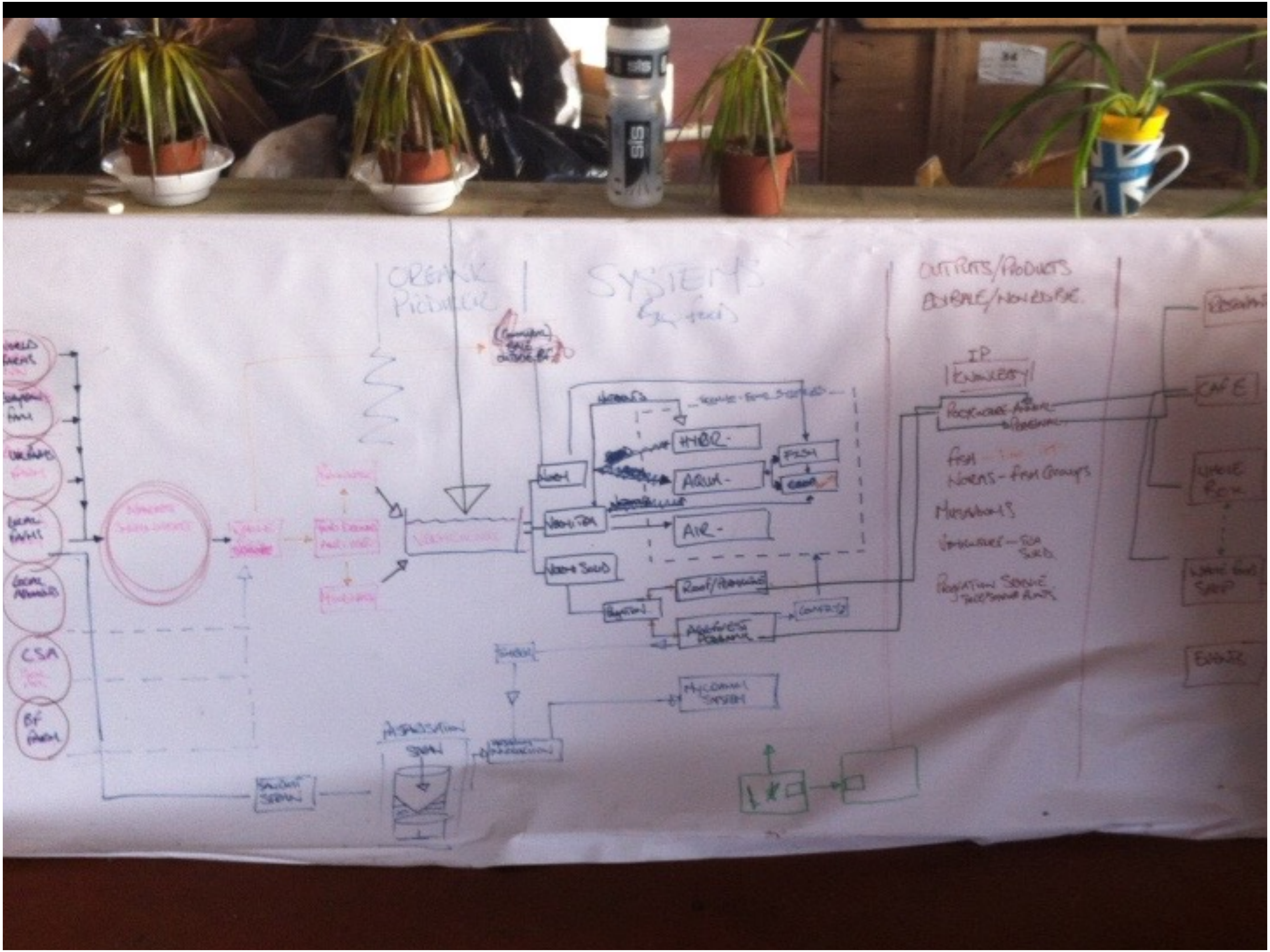
Dr Vincent Walsh

Director Biospheric Foundation – sustainability entrepreneur and whole system, organic urban farming.


WHAT TECHNOLOGY WANTS
KEVIN KELLY
Doing a literature review
URBAN NATURE
NEW UNIVERSE
Climate Justice


EAST PHLIP
STREET
WN02 GGK


INTER-SYSTEM CONNECTIONS



SYSTEMS
OUTPUTS/PRODUCTS
IP
KNOWLEDGE
HYDR-
AQUA-
AIR-
FISH
CSA
CAFE

MUSHROOMS

In the Biospheric Project's in-house mushroom laboratory, we are growing a variety of organic mushrooms (shiitake and oyster mushrooms, for example) on a number of commonly available, recycled substrates, including woodchip, sawdust, coffee grounds and chaff. In doing so, we're aiming to develop a deeper understanding of techniques that could be used for indoor urban mushroom production. In particular, we're hoping to determine the conditions that would be necessary in order to increase production to the point at which we could provide local restaurants and communities with fresh supplies of this nutritious and tasty foodstuff.

The production of gourmet crops such as mushrooms could have a range of advantages for the local community. Perhaps the most obvious is that such production would reduce our need to import crops from further afield, making them fresher and tastier while also reducing the environmental impact associated with large food miles. However, there are other benefits, not least of which could be that the production of mushrooms and other crops could help establish local social enterprises in the community.

Mushrooms also play a vital role in our outdoor forest garden; a range of edible and non-edible mushrooms are used to support the growing systems. Some species of medicinal mushroom like turkey tail (Trametes versicolor) are critical to soil and plant health, breaking down organic matter (e.g. dead wood from the trees), providing structure to the soil and even breaking down toxins into productive or non-harmful by-products. Trees and mushrooms have a mutually beneficial relationship (sugar from the mushrooms is exchanged for water from the trees) so can help each other grow and remain healthy.

For more information about how these crops are grown, please see our Mushrooms information sheet.


ROOF
GARDEN
The Biospheric Project's roof garden is one of the largest spaces in the building, and is home to leaf crops, honey bees, chickens and renewable energy systems. Designed as a modern-day Garden of Eden, over time it will become a green beacon in an urban environment.
The main growing space in the roof garden is the 15-metre polytunnel, in which we plan to grow leaf crops such as spinach, kale, lettuce, herbs, micro-herbs and possibly some grasses as well as a few edible flowers. Using a polytunnel results in higher temperatures, which improves the conditions for plant growth. These higher temperatures allow us to experiment with crops normally grown in warmer climates while also increasing the overall crop yield.
As in all natural systems, sunlight is a key component in the Biospheric Project, and our future designs include solar panelling on the south elevation of the roof to provide a natural energy source. The energy produced by the solar panelling would support a range of functions in the building, from the aquaponic systems to our in-house kitchen.
Also making their home on the roof are honey bees and chickens. The bees live in hives made from cedar, which has been chosen for its weather resistance, its good insulation qualities and the fact that bees seem more attracted to the smell of cedar than some other woods used for hives. As well as creating food, organic honey and eggs that are available locally and across the city through WholeBox and 78 Steps, our bees and chickens play vital roles in supporting the other ecologies in the system.
To find out more, please see the Roof Garden information sheet.

VERTICAL SYSTEMS

The Biospheric Project is a vertical growing system in the sense that we're using three floors of this old building (external ground, the second floor and the roof) in which to build interconnected food systems. However, the story doesn't stop there: our second-floor laboratory also includes two more vertical growing systems.

Our indoor aquaponic systems pump ammonia-rich water from fish tanks on the second floor to our rooftop polytunnel. On its way to the roof, the water passes through our vertical window-growing systems along the side of the building. These window systems act as biological filters and it is here that the ammonia in the water is converted to nitrates for use by the crops. Utilising the windows as a growing area allows us to grow a wider variety of crops such as tomato plants, strawberries, beans, peas and micro vegetables (carrots, courgettes and the like) on the second floor.

One of the window elevations is designed to feature an innovative new growing system: a bio-productive climatic façade system, aka 'Greenius Wall', created by MIF sponsors the Building Design Partnership (BDP) in conjunction with Queens University Belfast, the Biospheric Foundation, Glassolutions and Siemens. This prototype system is designed to maximise bio-productivity by using dormant space on the sides of buildings. The aim is to develop a fully functional vertical farm system, which could be replicated on a larger scale using available spaces in cities (hospitals, supermarkets, offices and so on) in the near future.

For more information about these vertical growing systems, please see our information sheets.


AQUAPONICS
As its name suggests, aquaponics is a combination of aquaculture, the process of rearing fish, and hydroponics, the process of growing plants in water. In aquaponics, these two disciplines are brought together in a way that benefits them both.
Fish produce two waste products: ammonia through respiration and solid waste. If these waste products are left to accumulate in the tanks, they can become toxic to the fish – but by using aquaponics, we can filter out this waste and put it to better use.
The ammonia-rich water is pumped through a series of filtration beds containing two types of bacteria that convert the ammonia into nitrite, then into nitrate. Our plants absorb this nitrate and use it as a nutrient for growing. After the plants have removed the nitrate the clean water can be re-circulated back to the fish tanks and the cycle can start again.
Our system differs from most aquaponic systems in that it is totally waste-free. Whereas most aquaponic systems collect and remove the solid fish waste using mechanical filtration, our system integrates worms into the filtration beds.
The worms break down the solid waste into accessible nutrients, which can be utilised within our system to grow more crops.
To learn more about aquaponics in general and our system in particular, please ask a member of the team or see the information sheet: Aquaponics.


78 SEVENTY EIGHT STEPS
WHOLEFOODS STORE
Greengate Housin
TMO - Community In
LOVE LOCAL FOOD
STAFF
78
SEVENTY EIGHT STEPS
LOCAL & ORGANIC
L O C A L
OPEN
WHOLEFOOD
Love your streets
IN Salford


TEA


BIOSPHERIC


BIOSPHERIC
FOUNDATION

WHOLE
BOX


THE STUDY


AQUAPONIC

Housing + science museum

New farming district…

⋯ in the city centre

Rural area stays as city grows

Lots of sunlight

sunquai

aquaponics

masterplan

Dr. Antonio Jose Garcia Cano

Art and ecology

University of Murcia, Spain

Fulbright Fellow, Tacoma

Washington State University, USA

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Co-ordinator

School of Science and the Environment
Manchester Metropolitan University

Valeria Ruiz Vargas

Valeria Ruiz Vargas – Manchester Metropolitan University,

for Sustainable Development Coordinator

– creativity, indigenous cultures and global citizenship


SUSTAINABLE DEVELOPMENT GOALS
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
SUSTAINABLE DEVELOPMENT GOALS


Responsible
Futures
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Responsible
Futures

Dr Antonio Cano

Ecological artist, postdoctoral research fellow, University of Washington-Tacoma, Fulbright Scholar – river restoration and cultural ecology.