



Sustainable Growing Futures

The Sustainable Growing Futures project is part of the *Engineering Future Generations: Carbon Literacy* research project, a collaboration between Cardiff School of Art and Design and AHR Architects funded by the Royal Academy of Engineering (RAE).

The aim of the Sustainable Growing Futures (SGF) project is to exchange and interactively transfer knowledge and grow the future. Led by Principal Lecturer Dr Keireine Canavan, the Sustainable Growing Futures project is a direct response to students' and researchers' interest in learning how to grow and create their own dyes, fibres, and materials in a sustainable and low carbon way.

The strategic ambition of the Sustainable Growing Futures project is to create a campus community of practice (CoP) and an interactive technological engagement to create growing garden climates and research that provide practical collaborative skillsets with a range of material sources for colour, fibres, and sustainable technology. While providing natural dye colour sources, fibrous materials for handcrafted paper and cloth will contrast with a precision agriculture CNC robotic garden and an interactive exchange of information via QR coding readable signage, video and links to the SGF website.

Sustainability and reducing carbon footprints, plus nurturing the earth and people's wellbeing is important. The knowledge transfer via QR codes linked to the SGF website will provide detailed information about the plants and how to process them for colour or materials to innovate and provide research-led curriculums and learning. This will support the university's strategic aims, address scholars, societal and industry's sustainable needs for the future, and embedded new knowledge for undergraduate credit-bearing modules and post-graduate research.

The measure of success will be collaborative student/ staff engagement, learning and innovation from Cardiff School of Art & Design, Cardiff School of Technology, and Cardiff School of Sport and Health Sciences, plus the inclusion of external local communities, school children and international groups. As an information repository the SGF project will link with the Interactive Materials Library as part of the Carbon Literacy Project to sustain our growing futures.

Botanical Dye Garden

Since Spring 2022, the Botanical Dye Garden has been home to a range of plants suitable for extracting pigment, many of which have been utilised for textile dyeing around the world for thousands of years. Included within this plot is a combination of common British species such as madder (*Rubia tinctorum*) and more exotic flora such as Japanese Indigo (*Indigofera tinctoria*) which is traditionally grown and processed in Eastern Asia and Central/South America. The project aims to reintroduce traditional textile dyeing techniques, to encourage the transition from synthetic to natural materials, and to educate about the benefits of self-growing for purposes of sustainable practice, responsible sourcing, and wellbeing.

The garden has been exploited for university wide natural dye workshops and has been embedded into the undergraduate curriculum and post graduate research, which has provided students with a

creative space for engaging in activities for wellbeing and research advancement. There is also opportunity for creative development for students within Cardiff School of Art & Design with the transfer of knowledge from the SGF team through planned future workshops which will see the transformation of pigment into mixed media application.



Botanical Dye Garden, May 2023.

Robot Garden

In May 2023 Cardiff Met became the first UK University to own and install a precision agriculture CNC robotic 'FarmBot'. The cutting-edge robot is programmed remotely via an app to automatically sow, water, weed and harvest crops, and will assist in cultivating a bed of dye plants and research activities.

The robot has been constructed by Cardiff School of Technologies lecturer Joel Pinney with assistance from his students.

"The importance of engaging with sustainability influences us all; no matter our discipline, from textiles to computing, we must strive for sustainable practices." ... "It has been commendable to see how the collaboration between the two schools has bloomed to deliver cutting-edge technology in the heart of the campus for a sustainable future. " – Joel Pinney

<https://farm.bot/>



FarmBot, May 2023.

Fibre and Materials Garden

The Fibre and Materials Garden is the SGF centre point for sustainable field to fibre production; providing participatory education and research opportunities. An aim of the garden is to engage SGF members and the wider volunteer community; creating an awareness of the benefits, specific terminology and processes involved in the production of sustainable natural fibres.

In May 2023, the pilot plot of flax (*Linum usitatissimum*) was sown in anticipation of processing the crop into a sustainable linen fibre. As flax has a rapid growth rate of ninety days, the plot will be ready to 'pull' as soon as August. Requiring no pesticides and being able to thrive solely on rainwater allows SGF to utilise this abundant Welsh natural resource.



Flax Plot, June 2023. Photo Credit: Tony Charles Photography.

Once harvested, Stroud based natural fibre education centre 'Flaxland' will facilitate a practical workshop onsite at SGF in Cardiff. This will create an accessible learning environment for twenty students and staff, while lowering the carbon footprint involved in travel. The participatory workshop will become the pivot point for ongoing field to fibre skill sharing.

www.flaxland.co.uk

The pilot plot of flax introduces further and more diverse natural fibre crops and plants, such as the cultivation of papyrus and paper mulberry to create paper, Japanese banana and agave for fibre and spinning. With the FMG becoming a broader educational mechanism and generating cross-school collaboration and research, the outcome will be hand-crafted making projects, with each step from growing to the making process being completed on the university site.



Fibre & Materials Garden, June 2023. Photo Credit: Tony Charles Photography.

Community Engagement

Alongside Dr Keireine Canavan a committee of volunteer Cardiff Metropolitan students and staff oversee roles such as garden management, event organisation and marketing. The team have taken advantage of university events to advertise opportunities and undertake practical demonstrations to seek engagement from internal and external participants, with a chance to network and partner with local organisations and businesses. The project is open to any person that wishes to participate.

Parallel to the Cardiff School of Art & Design 2023 Graduate Exhibition, SGF held a celebratory opening event on the 9th June initiated by the university Vice Chancellor which sought to raise awareness of participation opportunities and educate about global natural dye practices through an interactive dye demonstration. The event primarily targeted international students and local refugee communities, aiming to establish the community-oriented nature of the project.



SGF Opening Event. Photo Credit: Tony Charles Photography.

Education Opportunities

Already, SGF has catalysed enhanced learning experiences for current Cardiff Met students. From module embedded learning to community engagement; students are developing key transferable skills. The cross-school collaboration between Cardiff School of Art and Design and Cardiff School of Technology was initiated by a live brief; software Engineering students were tasked with designing the Sustainable Growing Futures website. The successful concept was designed by Moayed Gharebi. Developed by himself and Carlo Francesco La Piana; it features educational content, ongoing research updates and advertises volunteer and community engagement opportunities.

Members of the SGF team design and facilitate practical workshops; providing Cardiff Met students and external educators the opportunity to learn about natural dye techniques and natural fibre production. SGF workshops are broadcast across social media, Met Central and at the SGF stall on community days. Creating opportunities for skill and knowledge exchange is an important aim of the project. In this instance, local teachers are being equipped with hands on awareness of sustainable textile processes; enabling them to educate school children and the wider community.

Sustainable Growing Futures offers research opportunities and professional experience for undergraduate and postgraduate students. Two key volunteer members of SGF are students Adrienne Titley and Becca Clarke. PhD researcher Adrienne researches sustainable natural fibre and communities of practise in Wales. She has assisted in implementing a spectrum of SGF milestones, with focus on the development of natural fibre education and production. MA Creative Enterprise & Innovation student Becca, oversees the SGF community events and assists in delivering the natural dye

workshops; gaining valuable experience in planning and teaching for her professional development and expertise.

Future Plans

SGF has additional plans to develop a 'Singing Compost' garden as part of CSAD's Paul Granjon's research in collaboration with Harun Morrison Goldsmith's University Arts Research Garden, London. The Singing Compost is an installation of a mud-powered audio artwork that amplifies the sound of growing microbes in the ground.

Singing Compost: <https://vimeo.com/809587244>

Furthermore, a Medicinal Complimentary Garden for information transfer and wellbeing is at the planning stage in collaboration with the School of Sport & Health Sciences.

Grants and Funding

SGF Garden Project funding & sponsors:

Cardiff Met Estates, Cardiff School of Art & Design, Cardiff School of Technologies, Cardiff Met Sustainability, Cardiff Met Global Academies: Global Grants, Gavin Jones Ltd, Horniman's Museum & Gardens, Grow Wild & Kew Gardens, Goldsmiths: University of London.

Keireine Canavan was awarded Enterprise Educator 2023 for the Sustainable Growing Futures project by the Centre of Entrepreneurship with a prize of £1,000, which will provide valuable transferrable training and skills for students and staff, plus the procurement of equipment for the processing and production of flax to linen; with an outcome of products to be sold at the university Community Markets.

