The **Deeper** the roots,

the Higher the reach.

The Fourth China National Arts and Crafts Education Conference

1.

My name is Professor Stephen Bottomley, and I am the head of the School of Design at the Glasgow School of Art. Thank you for the invitation to be here today, it is a great pleasure and to be back in China and an honour to attend ‘The Fourth China National Arts and Crafts Education Conference’. My thanks for the support of Tsinghua University in being here.

My talk today will look to past histories and approaches to progressing the arts and crafts, as well as imagining future ones. Here and now, Artificial Intelligence impacts and changes the creative landscape of Arts and Design. The risks to sustaining a tactile or ‘real’ educational making experience are clear and decision are currently being made about the future of many of these disciplines and skills, and perhaps in haste. As the sayings go “Act in haste, repent at leisure” and “you don’t miss things until they have gone”.

We need to be alert and recognise that generations of skills demonstrate immense added value through their crafts and histories and provide a strong bedrock for new technologies to grow from.

But first I will introduce The Glasgow School of Art, one of the UK's last remaining independent Art Schools, ranked 3rd in the UK and 8th worldwide for Art & Design in 2026. Then I will give examples of how in our past we have shown resilience through innovation and adaptation.

2.

The ancient kingdom of Scotland became part of the United Kingdom in 1707.
It has a varied and dramatic landscape, divided mainly into the rugged Highlands in the north and west, and the rolling, fertile Lowlands in the south and east.

By Design, the Glasgow School of Art has two campuses. The original one is in Glasgow in the Lowlands and one in the Highlands. The City and the Rural are two important environments I will also come back to.

3

The City of Glasgow is Scotland's largest city, with only a population of around 650,000. Indeed, the whole country's population is under 6 million. I am told China has between 25 and 30 cities with larger populations than Scotland. The GSA has a population of around 3000 students, compared to many larger universities with many times that number. There are advantages in being small and agile.

Glasgow, renowned for its architecture, culture, and friendly people, has been named a European Capital of Culture (1990), a UNESCO City of Music (2008), and a City of Learning (2024), fostering pride and a sense of community. Located on the banks of the River Clyde, it is famous for its Victorian and Art Nouveau architecture, a rich legacy of the city's 18th–20th-century prosperity from trade and shipbuilding.

4

A saying in a city is that "the people make Glasgow", and they are the heart of the city's humour and pride. The Scots have a long-standing rivalry with their southern English neighbours.

For over a hundred years, Glaswegians have playfully mocked a statue of the English Duke of Wellington by crowning him with a traffic cone, turning it into a beloved city icon. This cheeky tradition is so famous that the artist Banksy even named it his favourite artwork in the UK, using it as his inspiration to exhibit in Glasgow in 2023.

5

Two new directors are in the process of being appointed. One director is for Rural Lab, an interdisciplinary research centre based in our Highlands & Islands Campus, Civic Lab, to be launched next year and will lead on practice-led research,

knowledge exchange, and innovation that connects creative disciplines with civic life, aiming to generate social, cultural, environmental, and economic impact.

Together, as an innovative model for arts and crafts education, they will foster research and inquiry, support interdisciplinary activity, and help build a thriving postgraduate research community.

There is an intentional balance between the rural and the city, sharing cultural roots and traditions to create ecosystems and environments where crafts, technological and materials research can grow and flourish.

6.
The Glasgow School of Art (GSA) currently has two major Arts and Humanities Research Council Doctoral Focal Awards, which fund PhD studentships and support creative economies in underserved regions.

Firstly, the ‘Golden Thread’: *Crafting the Creative Economy from Scotland's Highlands, Lowlands & Islands*. This seven-year initiative is led by the Glasgow School of Art in partnership with The Open University and Scotland's Rural College.

It establishes a distributed training college for twenty doctoral researchers, rooted in craft-led inquiry, to support Scotland's rural and island creative sectors. The first intake was for 2026-2027

Research themes include
- Biomaterials and regenerative Design
- Planetary and space sciences, astrophysics and cosmology
- Agriculture, aquaculture, animal sciences and animal care
- Environmental sciences and nature-based solutions
- AI and emerging technologies
- Rural geography, sociology and/or economies

The second is the Celtic Crescent Doctoral Focal Award: Co-led by Bangor University alongside the Glasgow School of Art and other regional institutions, this

multilingual consortium spans Cornwall, Scotland, and Wales. It funds PhD studentships for creative economy micro clusters affected by geographic, socio-economic, and linguistic marginalisation.

7.
A wise gardener understands a great deal about protecting and cultivating their plants and trees. When to prune a plant to encourage new growth, when to feed and water, and the importance of deep roots for survival and defence against adverse weather conditions.

Deep roots in heritage foster **innovation** in craft and design and are provided by traditional skills and technology.

8.
Founded in 1845 as one of the UK's first Government Schools of Design, the GSA traces its lineage to the 1750s and the establishment of the Foulis Academy, the United Kingdom's first School of Art.

Traditional skills were part of this origin story with Silversmithing, Jewellery and Textiles being taught alongside drawing and painting in the early 19th century when the Glasgow School of Art was established as a 'School of Ornamental Design'. The goal then was to develop National Manufacturers and industry and the goods that helped improve lives and homes. It has never stopped being our focus and as key today in this Fourth Industrial Revolution.

Charles René Mackintosh's Glasgow School of Art (left image) was completed in two phases, 1897-99 and 1907-09. It was his masterpiece, creating a unique bridge between Art Nouveau and Modernism through its use of materials and technology. It is referred to locally as 'The Mac'. Inspired by Japanese design and the Arts and Crafts movement, he favoured simple, unpretentious natural materials over heavy Victorian ornament, emphasizing grain, shadow, and tactile surfaces. He contrasted heavy, raw elements—such as roughcast stone—with expansive glass windows and delicate iron detailing that made massive structures feel airy and animated

In 2014, a new design school, the Reid Building, was built directly opposite the Mac. Designed by Award-winning American architect Steven Holl, it is a complementary reflection on the 1909 art school.

9.
Features of the Reid include generous, wide corridors and stairs and many seating points to encourage connection and conversation. Three cylindrical shafts, described by Holl as "driven voids of light", illustrated here on the plans, bring illumination into the centre and form part of this "circuit of connection" over a vast building.

The Mac was damaged by two terrible fires, the first in 2014 and the later, more devastating one in 2018, which also damaged the Reid buildings' glass facade. These have been challenging times for the school, our community on Garnethill, and our City. The GSA has had to evolve with a different campus while the Mac building is wrapped in a protective layer.

10.
The School of Design is the largest of GSA's four schools, with three main sites in Glasgow City. The other Schools include the School of Fine Art, the Mackintosh School of Architecture, and the newest school, the School of Innovation and Technology.

11.
The School of Design is made up of seven Departments with many UG and PG level programmes connected to the following key:

- Silversmithing and Jewellery
- Fashion and Textiles
- Product Design Engineering (and the joint programme with the University of Glasgow)
- Communication Design
- Interior Design
- Interaction Design

A department of Design History and Theory underpins Undergraduate and post graduate study

12
The Reid's public ground floor has two outstanding exhibition gallery spaces and archive facilities. The Centre for Advanced Textiles, a commercial print bureau specialising in sustainable digital fabric printing, supports external clients, including international artists and world class museums, as well as students across the GSA, and recently it celebrated its 25th anniversary.

13
The building is home to our seminar spaces, auditorium, and an expansive, well-equipped technical services department.

14
These shared spaces combine traditional process-led workshops for woodworking, metalwork, ceramics, textiles, casting, and print with media and digital technologies.

15
In 2025, our Case Room celebrated its 60th anniversary of providing expertise to students, staff, and external arts organisations and individuals. With a focus on letterpress printing, which involves using raised metal or wooden type to create impressions on paper, a large range of relief printing techniques, bookbinding and experimental book design, large format printing, and traditional hand printing methods. Together, we provide a vibrant community that offers a unique student experience and nurtures the transition from academic to professional life.
The Case Room's deep roots feed our staff and students, encouraging and inviting curiosity and inspiring iterative ways of working through experimentation – combining analogue and digital technologies to develop new concepts.

A current exciting project, 'Typographica Scoto-Gadelic' by researcher Edwin Pickstone, includes research into traditional wood type conversion, casting grave accent vowels for Gaelic setting and handset physical typography specific to the language.

16.
My own training is as a jeweller and a maker. My practice has evolved around the use of technologies and materials, and not always familiar ones to the traditions or conventions of the time when they were used.
My research explores how intangible craft histories and contemporary jewellery techniques can be reframed through an ever-evolving range of digital technologies, scientific methods and industrial materials.

17
Past practice has included combining traditional craft techniques such as vitreous enamelling, embossing, press-forming, and etching with digital printing, scanning, and computer-aided Design.
The layering of imagery through embossed, repetitive textures, oriental motifs, and mathematical geometry lends itself to graphic and print traditions, not so far from the skills of the case room.
My works are in the collections of the National Museums of Scotland, the British Museum, and the Cominelli Foundation Collection in Italy, and I am delighted to have a piece being exhibited later in the year at the Hangzhou International Contemporary Craft Art Exhibition *'The Things Themselves*'.

In our ever-increasing digital world, it is natural to feel threatened by technologies like Artificial Intelligence, fearing a total loss of connection with the material world around us.

18.
There are past precedents I would like to share for when technological innovation felt overwhelming to creatives and the industry, or craft.

The next few slides are part of a keynote at the Beijing Institute of Fashion and Textiles Education Forum in 2025, collaboratively written with Paul Chapman, Professor of emerging technologies at the GSA.

Woodblock printing and movable type originated in China during the Tang and Song dynasties, between the 6th and 12th centuries, initially on clay and silk, and were later perfected for paper.
In Europe at this time, scribes were hand-copying and illustrating on parchment, and it was not until the 14th Century that Johannes Gutenberg introduced the modern metal-type printing press in 1450.

Scribes who spent months hand-copying single books watched machines produce thousands of copies in days. They declared this would 'destroy the sacred art of beautiful writing.' Universities banned printed books for decades, claiming mass production would 'cheapen knowledge.'

Scholars argued that only hand-copied manuscripts had authentic value.
Before printing, all of Europe's books would have fitted in one modern library.
By 1500, there were 20 million printed books in circulation.

Scientific discoveries that took decades to travel from Italy to England now spread in months. Knowledge moved from the exclusive domain of the wealthy to anyone who could read.

The scribes were right - their profession, as it was, vanished, yet Illustrators and graphic designers still combine image and text, and both are a creative industry. Remember the scribes- we mention them again later.

However, the printing press did not destroy creativity; it democratised it, and the spread of knowledge that ushered in the Renaissance and the first period of Science, Technology, Engineering, Art and Maths was interwoven with and fuelled innovation and creativity.

Crucially, those who adapted did not just find new work - they invented entirely new professions. Typesetters, publishers, editors, printers, book distributors - jobs that could not exist before the technology created them. The printing press did not just replace jobs; it created an entire industry.

This pattern - fear, resistance, then explosive creative expansion with new roles we could not previously imagine - would repeat itself with every major technological shift.

19.
This brings us to the 1830s, when another technology threatened to 'destroy art forever'. The author Robert Hughes wrote of a 'Mechanical Paradice' in his seminal book 'The Shock of the New' and described the impact of inventions and the spread of mechanical cameras, X-ray machines, automobiles, and aircraft. If he were alive today, his book would be updated to include smartphones.

When Photography was invented in the 1830s, the art establishment was horrified. French painter Paul Delaroche famously declared, 'From today, painting is dead!'

Taken in 1838, Louis Daguerre's photograph of a Paris street scene shows a man standing on the Boulevard du Temple, having his shoes polished. It is widely believed to be the earliest extant photograph of human figures.

Eadweard Muybridge was a pivotal figure in early Photography, most famous for his groundbreaking motion studies, such as the 1878 sequence of a galloping horse, and his invention of the Zoopraxiscope. Arguments around the position of Photography versus painting went on for decades. At the same time, artistic styles were radically influenced by this realism and the changing perspectives of art. The movement of creatures, planets, and time itself was better understood as humanity took to the skies and aerial Photography was born.

20.
By the early 1900s, as cinema's popularity grew, the critical reaction of artists affected reached a fever pitch.

Stage actors dismissed cinema as 'not real performance' - after all, how could something recorded and mechanical compare to live human artistry?

Critics called it a 'fleeting novelty' that would never replace 'legitimate' theatre. They were absolutely convinced this was just a fad.

Educators were equally concerned. They worried that moving pictures would make people illiterate and lazy - that audiences would lose the ability to use their imagination if everything was shown to them visually.

Ultimately, cinema did not kill theatre; it existed alongside it. It also created an entirely new art form. It gave us revolutionary storytelling techniques and new forms of visual expression, eventually becoming one of the most powerful creative media in human history and continuing to evolve alongside a variety of traditional and automated media.

The cycle repeats itself- initial fear, fierce resistance, predictions of doom for traditional forms... followed by expansion of creative possibilities, instead of destruction.

Reflecting on the introduction of new technologies like 3D printing, laser cutting and sintering, through computerised machines or online learning platforms. They all experienced fierce resistance in their adoption. The pattern is remarkably consistent across countries and centuries.

Each time, we predict that the new tool will make students lazy, destroy essential skills, and undermine authentic learning.
Each time, we can be focused on what we might lose rather than what we might gain.

21.
High-quality images, animations, and films have become very familiar; fed by algorithms, they look hyper-realistic. This image of a tiger was created for a product

design by a group of Beng students and shows how powerful a tool it is and why creatives also fear it. The Design for a tiger feeder buoy floats in the water and helps create the imagined environment for a feeding event at a Scottish zoo.

22.
Two years ago, the UK's leading universities - including Glasgow - published these comprehensive AI principles. They committed to making all students and staff AI-literate. They have had two years of implementation.

23.
But what will be the cost in jobs and in more traditional courses and departments for this rapid implementation, particularly in the Arts and Humanities? We are already seeing world-leading craft programmes being closed across the world, three in the last month with live on-line petitions in the UK, USA and Canada.

24.
Let me show you a chart by Gartner - they are the world's leading technology research firm, which the GSA professor Paul Chapman, Director of Emerging Technology, showed our strategic leadership group last month. It tracks how new technologies mature from initial hype through to productive use.
The chart looks like a roller coaster ride, and it feels like one.

Look at these timelines. 2 to 5 years for Generative AI to reach mainstream productivity. That is essentially one undergraduate degree cycle. The students we are admitting to GSA will graduate into a fully integrated AI economy.

However, Generative AI is just the first wave. Look what is coming behind it: Agentic AI, AI-enabled teaching avatars, self-integrating applications. We are not facing a single disruption but successive waves of transformation.

Every institution will eventually reach this productivity plateau. The question is whether we lead the transition or scramble to catch up. Oxford and MIT are not just preparing for Generative AI - they are building the capability to ride whatever comes next. Moreover, Gartner puts a specific number on this transformation... By 2028

25.
Craft and Design is a key part in navigating and grounding this rollercoaster ride.
Let us look at some of the work and news from the School of Design at the GSA.

Anna Gordon leads this world-class department, and the undergraduate programme has moved from 4 years to 5 years, adding an integrated master's that will provide funded places for Scottish resident students.

26
Joining her fantastic team is Dr Mathew Lambert, who is leading a new stand-alone 1-year master's program that has recruited a well-balanced mix of students from across the world to study in Glasgow.

27
Another GSA jewellery designer and academic who is teasing creativity from the machine and inspiring future generations is Silvia Weidenbach.
Silvia is an apprentice trained Silversmith with an extensive knowledge of haptic digital tools as well as traditional making.

Silvia combined contemporary and traditional techniques in her work, as shown here with a 3D-printed brooch featuring semi-precious stones set in silver and gold.
In partnership with image maker Jon Emmony**,** have digitally interrogated historic collections to present hybrid versions between silversmithing and digital futures

28
At GSA, students are encouraged to explore a variety of different techniques and materials, including digital Design and 3-D printing as is Graduate Lucy Pearl Petts, pictured here in 2022.
We can, and will keep, interpreting and applying the technology we want to use as creatives, to enhancing studio practice, adding another tool to our toolbox.

29
The MDes Interior Design curriculum prioritises investigating "why" interiors are produced rather than just "how".

Challenging traditional disciplinary boundaries, a project by Eden Uta explores the conversion of abandoned or demolished "third places" into virtual environments, treating digitisation as a form of adaptive reuse.

30
This digital reconstruction offers a resilient, sustainable method for preserving heritage that withstands physical demolition.

By capturing a site's character rather than its material form, it removes geographic barriers, allowing displaced or migrant communities to access culturally significant places online.

31
Professor Jimmy Stephen Cran leads the Master's in Fashion Design. This innovative programme encourages a playful, unrestrained "dress-up box" approach to subvert and disrupt traditional craft and clothing rules.

2D and 3D integration enables effortless movement between two-dimensional surfaces and three-dimensional forms.

32
Pigbus, in his project 'Alien', explains how he is drawn to distortion, movement and unconventional forms, exploring how garments can communicate emotions beyond their functional purpose. Rather than treating fashion as a fixed image, he sees it as a constantly shifting experience shaped by the body, the viewer and the surrounding context.

33
This project began with an exploration of sound distortion of Hua Chenyu's 'Alien', evolving into a series of visual experiments (see Abstract Image 1).
Using these abstract patterns as a starting point, he then employed AI to generate and develop both surface applications and three-dimensional forms on the body. These AI-generated outcomes informed a range of physical prototypes, which were subsequently translated into three-dimensional garments through multiple iterations.

34
What particularly impressed the fashion team about this work is the seamless integration of the physical outcomes (shown against the dark background) with the AI-generated imagery (shown against the light background). The distinction between the two becomes almost impossible to identify, demonstrating a sophisticated integration of AI within the design development process.

35
"Be careful what you wish for, because you just might get it", is a popular proverb.

We must ensure that the tacit, material knowledge that has fed the development of studio and craft cultures for thousands of years feeds into to the fast-changing world we currently inhabit. Craft specialisms need to flex and adapt, we do not want these to vanish. Remember the Scribes who as an industry vanished after the invention of the printing press.

Craft, Art and Design are incredibly deeply rooted with long traditions that enable them to stand tall and reach ever higher creatively.

Any other approach to meaningfully develop the new digital and AI technologies being so rapidly developed, other than hand in hand with hand skills and material understanding, limits the creative heights achievable, or it risks collapse.

This fall is due to a lack of understanding or support and the falling over by the absence of an ability to balance, a skill we learn from a young age.

When environmental conditions become challenging and change is forced without considering the environment, we do not achieve our potential.
As makers and creatives, we must integrate our approach across old and new technologies, or risk following the path of the scribes.

The path ahead is not clear, has not been navigated, and will require change, but it can lead to an interesting place for arts education and of new creative growth, achieved through harmony.

It has been a privilege to be here today to discuss this journey and champion the role of making and material expertise in the expedition, as a custodian of studio and craft practice.

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Research

https://radar.gsa.ac.uk/profile/1662