STAGE ELECTRICS®

CASE STUDY

University of Greenwich

IMMERSIVE AUDIO RESEARCH
LAB AND MULTI-PURPOSE THEATRE

The Stage Electrics team was commissioned by Professor Andrew Knight-Hill, Professor of Music and Sound Arts at the University of Greenwich following a generous grant from the Arts and Humanities Research Council (AHRC).

This funding, part of the Creative Research Capabilities Project, represents a government investment aimed at bolstering creative research practices. Recognising the substantial contribution of creative industries to the UK economy, the AHRC allocated funds via the World Class Labs scheme to drive innovation and help bring to life the ambitious visions and ideas of University of Greenwich's creative research community.

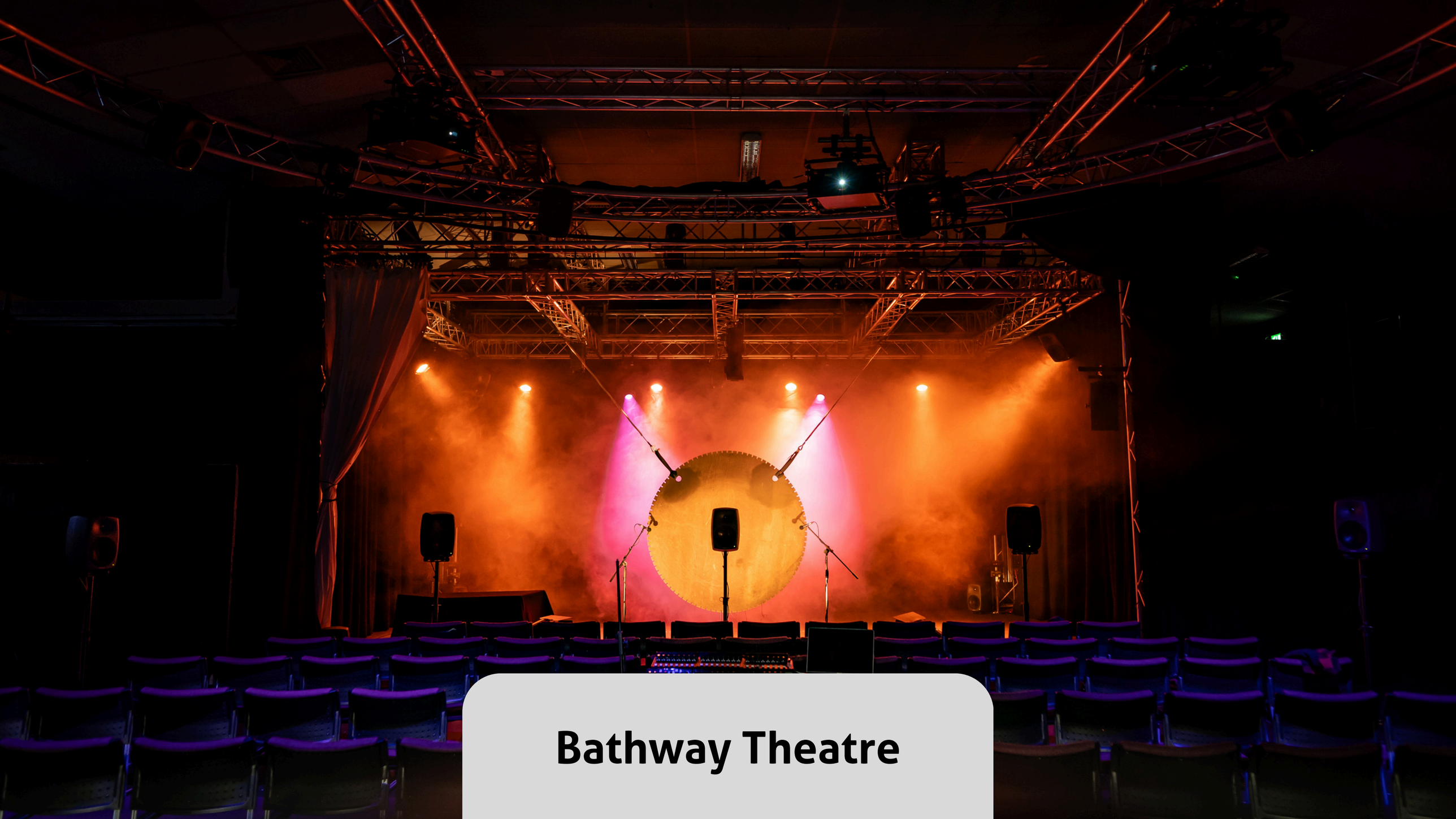
The project comprised two sub-projects, the Immersive Digital Theatre in Woolwich and a new Spatial Audio and VR Lab within the King William Building, a former naval college in Greenwich. The University of Greenwich team's goal was to create a facility that served as a cutting-edge theatre for drama and performance while also providing space for creative and immersive sound research practices.

This ambitious transformation aimed to develop adaptable, research-oriented spaces equipped with a state-of-the-art ambisonic sound system and accompanying infrastructure. The adaptability of the spaces would enable seamless shifts between performances and technical research activities, pushing boundaries in the fields of immersive sound and spatial audio technology.

"The vision for this space was to create a flexible environment that fosters possibility—allowing people to realise whatever they can dream, breaking the concept of a traditional stage, and dissolving the boundary between stage and audience in an accessible, user-friendly way. Our research is about creative practice, pushing art forms forward through innovation and creativity. How do you enable people to explore immersive tools and technology without letting the technology hold them back?

We are, first and foremost, creatives working with technology, not engineers. So, it's essential that the learning curve isn't too steep; it should feel seamless. This is where Aaron from Stage Electrics' incredible work on the infrastructure really shines, creating that seamless flow. People can focus on their creativity without getting bogged down by the tech."

Professor Andrew Knight-Hill
Professor of Music and Sound Arts
University of Greenwich



Bathway Theatre

Our challenge was to create solutions for the theatre that would allow for extremely precise speaker placement, essential for immersive audio research, while remaining fully adaptable to accommodate the needs of both theatre and research projects. Flexibility was key. Professor Knight-Hill initially presented us with sketches featuring three distinct pods, two rectangular ‘stages’ and a central circular pod allowing for simultaneous research activities across the three zones.

Adaptability and Flexibility

The key requirement was flexibility, allowing users to rearrange the space and its resources according to the needs of each project. Professor Knight-Hill’s initial concept of three modular “pods” informed the final layout, enabling users to work within distinct zones independently or collaboratively across the space.

Audio Innovation

In the Bathway Theatre, the audio system was meticulously designed to support immersive and flexible soundscapes. A sophisticated speaker array was installed, allowing for precise sound placement and the ability to adapt to various configurations, including single large ambisonic arrays or distinct multichannel zones. This versatility supports a range of applications, from promenade performances with dynamic sound transitions, to seated audiences experiencing sound travelling around them. This setup enables seamless integration of multichannel formats like Dolby Atmos, ambisonics, and experimental spatial sound designs, fostering creativity and providing an unparalleled auditory experience.

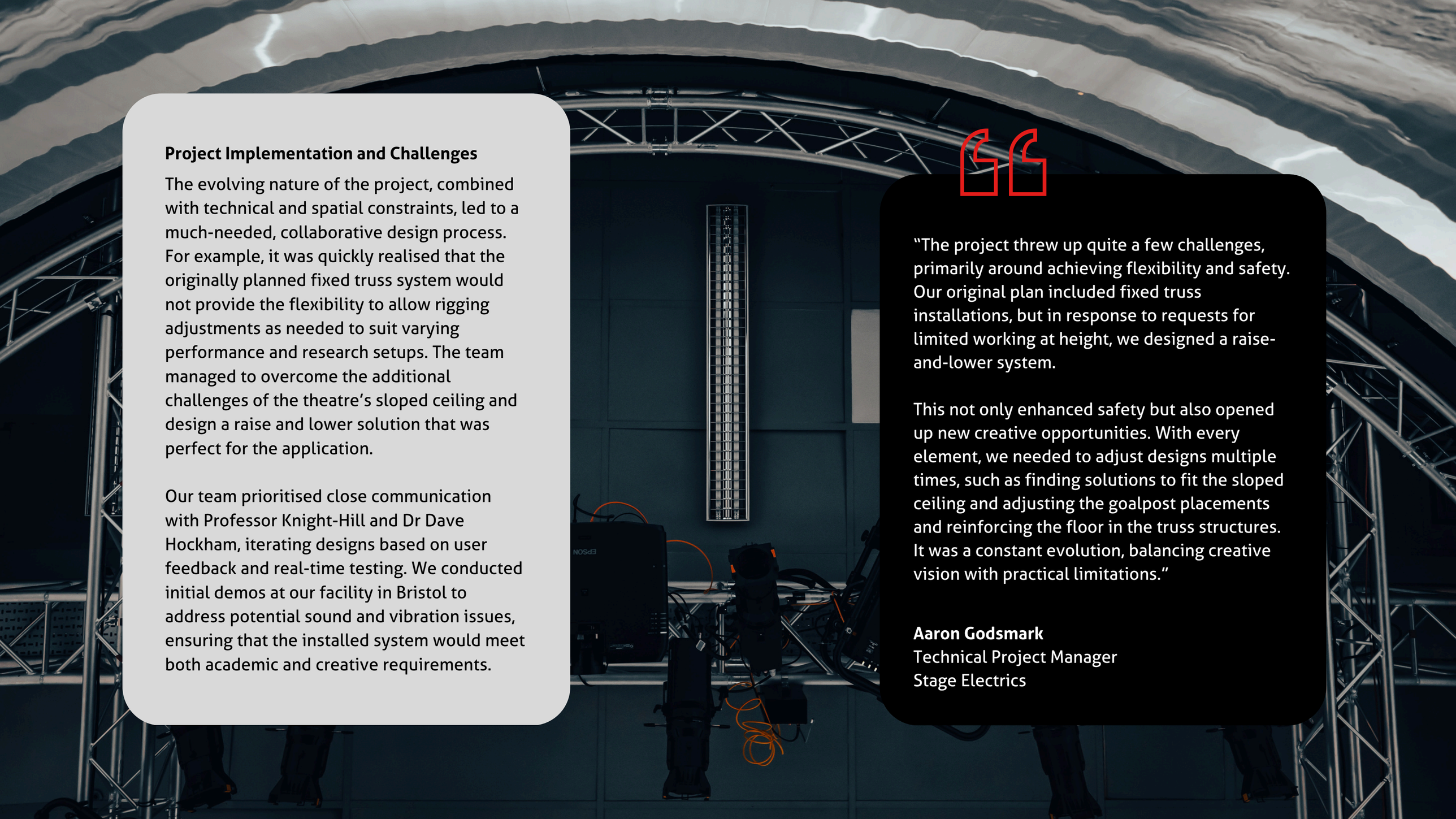
AoIP data cabling infrastructure has been spread in each of the 3 pods, its vast capacity allowing for seamless audio routing, setup and use. The university selected Genelec as their loudspeakers of choice, throughout the installation. The system’s configuration permits different spatial arrangements, accommodating both traditional theatrical setups and experimental audio research.

Modular Cyclorama and Rigging for Multi-Use

The central circular zone also includes a 9m diameter 360-degree cyclorama screen suspended from a curtain rail that can be derigged and pulled out of the way within 10 minutes, allowing swift transformations between setups.

Enhanced Safety and Accessibility

To minimise working at height, a custom rigging system was developed that allows the truss and lighting setups to be raised and lowered easily. This feature ensures safer and more accessible operation for students and technicians, enhancing both the functionality of the space and the learning experience.



Project Implementation and Challenges

The evolving nature of the project, combined with technical and spatial constraints, led to a much-needed, collaborative design process. For example, it was quickly realised that the originally planned fixed truss system would not provide the flexibility to allow rigging adjustments as needed to suit varying performance and research setups. The team managed to overcome the additional challenges of the theatre's sloped ceiling and design a raise and lower solution that was perfect for the application.

Our team prioritised close communication with Professor Knight-Hill and Dr Dave Hockham, iterating designs based on user feedback and real-time testing. We conducted initial demos at our facility in Bristol to address potential sound and vibration issues, ensuring that the installed system would meet both academic and creative requirements.

"The project threw up quite a few challenges, primarily around achieving flexibility and safety. Our original plan included fixed truss installations, but in response to requests for limited working at height, we designed a raise-and-lower system.

This not only enhanced safety but also opened up new creative opportunities. With every element, we needed to adjust designs multiple times, such as finding solutions to fit the sloped ceiling and adjusting the goalpost placements and reinforcing the floor in the truss structures. It was a constant evolution, balancing creative vision with practical limitations."

Aaron Godsmark
Technical Project Manager
Stage Electrics

Key Benefits and Project Impact

Enhanced Creative and Educational

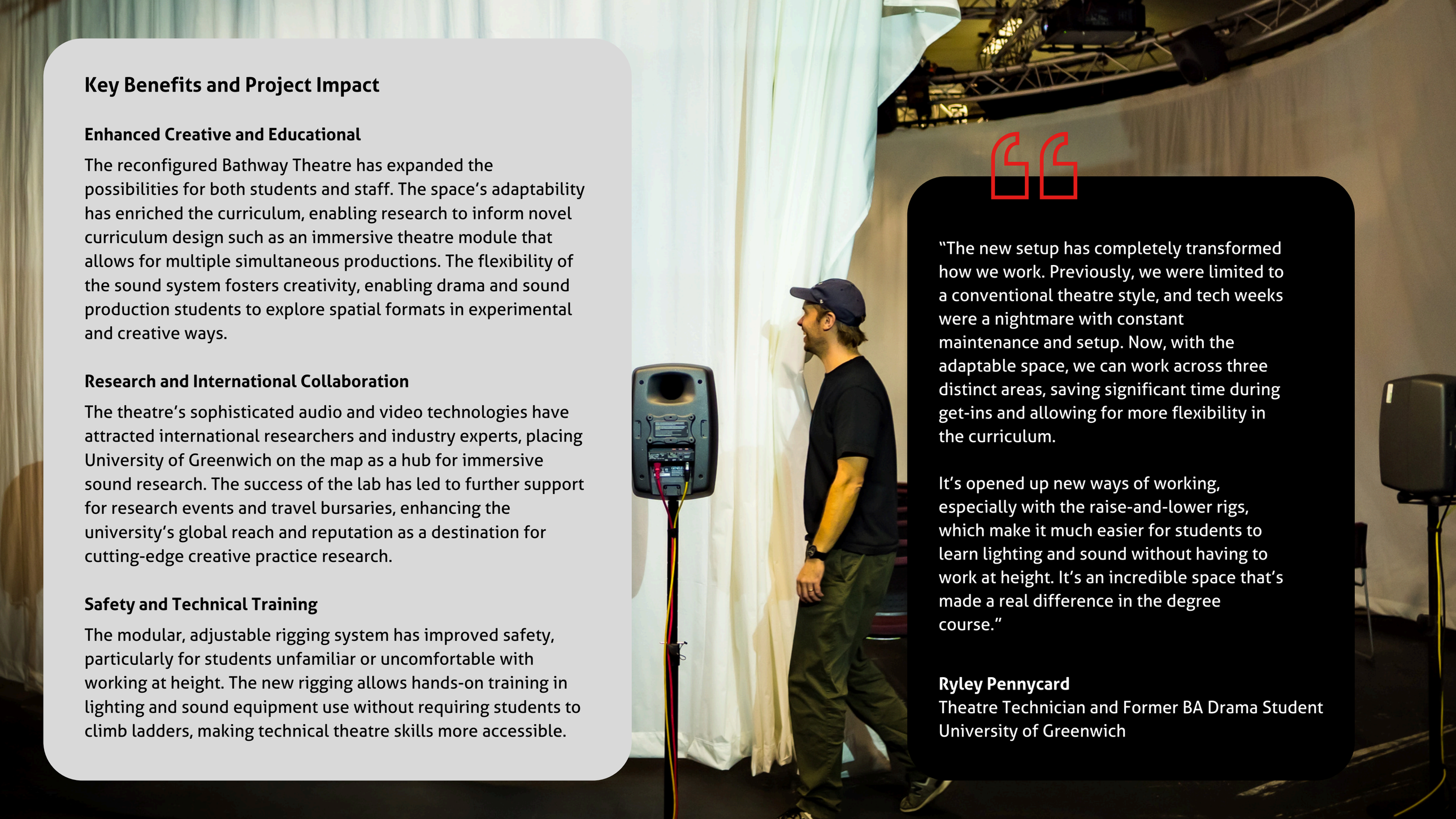
The reconfigured Bathway Theatre has expanded the possibilities for both students and staff. The space's adaptability has enriched the curriculum, enabling research to inform novel curriculum design such as an immersive theatre module that allows for multiple simultaneous productions. The flexibility of the sound system fosters creativity, enabling drama and sound production students to explore spatial formats in experimental and creative ways.

Research and International Collaboration

The theatre's sophisticated audio and video technologies have attracted international researchers and industry experts, placing University of Greenwich on the map as a hub for immersive sound research. The success of the lab has led to further support for research events and travel bursaries, enhancing the university's global reach and reputation as a destination for cutting-edge creative practice research.

Safety and Technical Training

The modular, adjustable rigging system has improved safety, particularly for students unfamiliar or uncomfortable with working at height. The new rigging allows hands-on training in lighting and sound equipment use without requiring students to climb ladders, making technical theatre skills more accessible.



"The new setup has completely transformed how we work. Previously, we were limited to a conventional theatre style, and tech weeks were a nightmare with constant maintenance and setup. Now, with the adaptable space, we can work across three distinct areas, saving significant time during get-ins and allowing for more flexibility in the curriculum.

It's opened up new ways of working, especially with the raise-and-lower rigs, which make it much easier for students to learn lighting and sound without having to work at height. It's an incredible space that's made a real difference in the degree course."

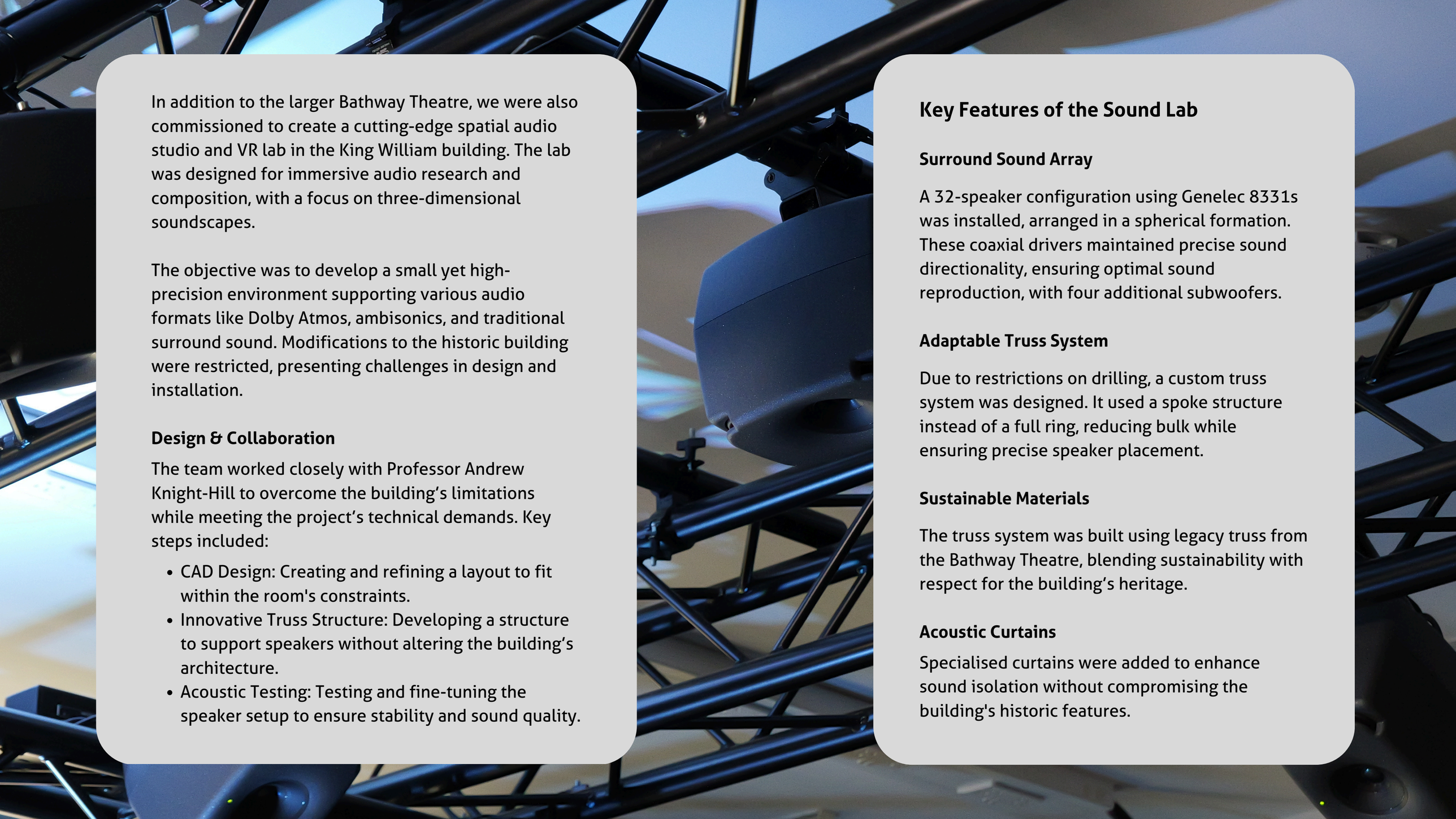
Ryley Pennycard
Theatre Technician and Former BA Drama Student
University of Greenwich

“The adaptability and hybrid nature of the space have made it a remarkable site for exploration in music and sound. We can work in distinct zones or create a 360-degree sound environment, allowing students to gain hands-on experience in various spatial formats—multichannel, ambisonic, Dolby Atmos, and more.

It offers unique learning opportunities compared to other facilities, supporting a range of creative and research-focused work in spatial audio that simply wasn’t possible before.”

Dr Emma Margetson
Senior Lecturer in Music and Sound
University of Greenwich

Spatial Audio and VR Lab



In addition to the larger Bathway Theatre, we were also commissioned to create a cutting-edge spatial audio studio and VR lab in the King William building. The lab was designed for immersive audio research and composition, with a focus on three-dimensional soundscapes.

The objective was to develop a small yet high-precision environment supporting various audio formats like Dolby Atmos, ambisonics, and traditional surround sound. Modifications to the historic building were restricted, presenting challenges in design and installation.

Design & Collaboration

The team worked closely with Professor Andrew Knight-Hill to overcome the building's limitations while meeting the project's technical demands. Key steps included:

- CAD Design: Creating and refining a layout to fit within the room's constraints.
- Innovative Truss Structure: Developing a structure to support speakers without altering the building's architecture.
- Acoustic Testing: Testing and fine-tuning the speaker setup to ensure stability and sound quality.

Key Features of the Sound Lab

Surround Sound Array

A 32-speaker configuration using Genelec 8331s was installed, arranged in a spherical formation. These coaxial drivers maintained precise sound directionality, ensuring optimal sound reproduction, with four additional subwoofers.

Adaptable Truss System

Due to restrictions on drilling, a custom truss system was designed. It used a spoke structure instead of a full ring, reducing bulk while ensuring precise speaker placement.

Sustainable Materials

The truss system was built using legacy truss from the Bathway Theatre, blending sustainability with respect for the building's heritage.

Acoustic Curtains

Specialised curtains were added to enhance sound isolation without compromising the building's historic features.

“The sound lab was designed as an intimate space for focused composition, editing, and research. We wanted a dimensional surround sound array—not just on one plane, but with height and depth as well. The challenge was creating the largest possible sound sphere without altering the historic structure of the old Royal Naval College building.

By recycling the original ground support truss from Bathway and avoiding excess ironwork, we kept the space feeling light and airy, allowing creativity to be at the forefront without overwhelming students with technology and infrastructure.”

Professor Andrew Knight-Hill
Professor of Music and Sound Arts
University of Greenwich

The re-envisioned Bathway Theatre and the adjacent Spatial Audio and VR Lab in the King William Building have collectively created a vibrant, multi-functional environment for performance, research, and education in immersive sound and theatre.

By balancing historical constraints with cutting-edge design and sustainability, the project has brought lasting value to University of Greenwich. The space now serves as a model of how adaptability and user-focused design can drive creative and technological innovation, fostering an international network of immersive sound and theatre research.

Each year the Immersive Digital Theatre in Bathway hosts the SOUND/IMAGE Festival, with over 500 researchers from 16 countries applying to present their research, and travelling from all over the world to experience this cutting-edge facility, further solidifying University of Greenwich's place as an authority in the world of audio and immersive performance research.

"The most significant impact has been the modularity and flexibility of the space. It's been fantastic to see people use it in diverse ways, from staging theatre in the round to creating promenade performances.

The ability to quickly reconfigure the cyclorama screen and adjust the speaker system as one large array or separate zones has been invaluable. It's allowed us to dissolve traditional boundaries between audience and stage, enabling a new realm of immersive experiences where the technology supports creativity without getting in the way."

Professor Andrew Knight-Hill
Professor of Music and Sound Arts
University of Greenwich

How Can We Help You?

Stage Electrics provide technical services and products for venues and production companies.

We take care of our clients through the three specialist divisions of Stage Electrics: Projects, Equipment Sales and Venue Services.

Projects

Our Projects department facilitates a wide range of projects and installations. Our experts will look after all your design, installation, and commissioning needs for new-build and refurbishment projects. We work on installations of all scales, from village halls and schools to multi-million-pound projects like the Shakespeare North Playhouse in Prescot or Soho Place in London. Our Projects team is ready to help with as much or as little as you need us to do.

Equipment Sales

Stage Electrics supports thousands of venues and professionals across the UK with their production technology and consumable needs. We stock products by over 100 manufacturers in our Bristol warehouse, many of which are available for same-day dispatch. Our online store is quick and simple to use. If you require personal assistance, our Equipment Sales team would be delighted to provide you with all the help and guidance needed to make a well-informed decision.

Inspection and Testing

The Stage Electrics Venue Services team will help you maintain a fully functional and legally compliant venue and performance space. We are a NICEIC certified contractor, providing tailored packages for electrical and mechanical inspections as required by BS7671, ISITEE, PUWER, and LOLER. Our specialist onsite crew are highly qualified, and DBS checked to enhanced level—the safety and functionality of your venue couldn't be in better hands.

WE MAKE PERFORMANCE POSSIBLE

STAGE ELECTRICS®

Let’s Talk

If you’d like to learn more about our Projects services, we’d love to hear from you.

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