



# RESILIENCE

UK Medicines Manufacturing  
Skills Centre of Excellence

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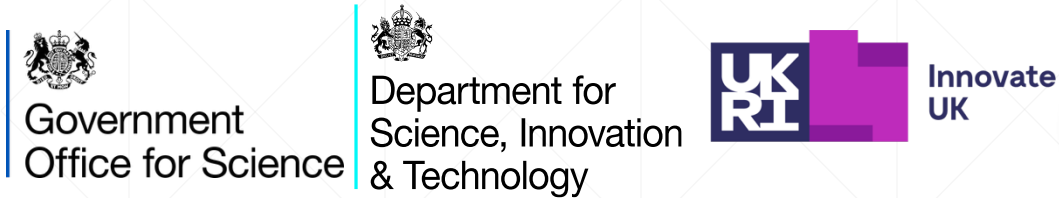
5<sup>th</sup> November 2025



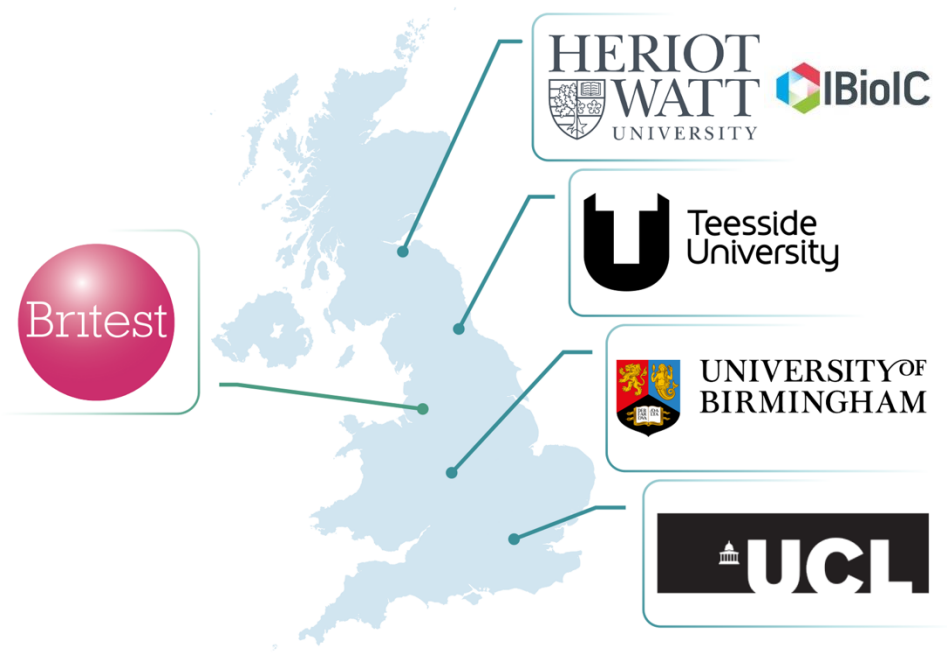
# RESILIENCE partners & funders



A national network pioneering delivery of new, standardised and quality assured training and learning materials for the *medicines manufacturing sector*.



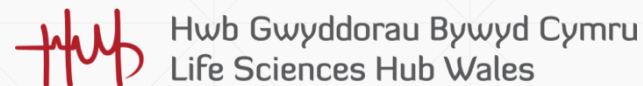
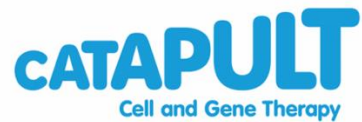
**Ivan Wall** Co-Director UoB Lead  
**Gary Lye** Co-Director UCL Lead  
**Nik Willoughby** HWU Lead  
**Safwan Akram** Teesside Lead  
**Kirk Malone** BRITEST Lead



# Strategic Collaborations



We are working in synergy with other nationally funded skills initiatives and a scalable, UK-wide, membership network addressing all medicines modalities:



# RESILIENCE events across the nation

## England



## Scotland



## Wales



## Northern Ireland

Event scheduled for 12 Nov

# Addressing the national skills needs

## Acute skills shortage



- How to attract to STEM
- Mobilising diverse talent
- Re-training needs
- Talent pipeline

**We need to increase the whole talent funnel**

## Sector is evolving



- New therapeutics
- New technologies (digital, automation, PAT)
- Emerging tech (AI, robotics)

**Skills and competency needs of the sector are evolving**

## Radical change needed



- Traditional approach does not = workplace readiness
- Alternative learning styles
- Net zero

**New approaches fit for industry and fit for the learner**



**Sustainability  
& Net Zero**



**Scalable Talent  
Development Network**



**Quality Assured  
Training**

**Our Mission**



**Digital Literacy**



**UK-wide  
Access & Impact**



**Equality, Diversity &  
Inclusion**

# Over 40+ Courses in Core Portfolio

Quality-Assured across expert training organisations

## Fundamentals in upstream and downstream processing

Certificate of Upstream Bioprocessing (IBioIC)  
Mastering Protein Purification using Chromatography Techniques (IBioIC)  
Advanced Downstream Bioprocessing: From Harvest to Purity (IBioIC)  
Pilot-Scale Upstream Bioprocessing: 300L Bioreactor training (IBioIC)  
BioProcess360: Integrated Upstream and Downstream BioProcessing training (IBioIC)  
Applied Skills in Mammalian Cell Bioprocessing (IBioIC)  
Introduction to Practical Fermentation (IBioIC)  
Introduction to Practical Downstream Bioprocessing (IBioIC)  
Practical Skills for Upstream Bioprocessing (TU)  
Practical Skills for Downstream Bioprocessing (TU)  
Advanced Downstream Bioprocessing (TU)  
Advanced Upstream Bioprocessing (TU)  
Practical Skills: Cell Culture Methods for Drug Testing (TU)  
Principles of Fermentation Processes (UCL)  
Rapid Fermentation Process Development (UCL)  
Downstream Processing: Primary Recovery (UCL)  
Downstream Processing: Chromatography (UCL)  
Cell Culture and Analysis (UCL)

Chromatography (UCL)  
Microbial Fermentation (UCL) NEW  
Mammalian Cell Culture Bioreactors (UCL)  
Membrane Processes (UCL)  
Pilot Scale Fermentation and Cell Recovery (UCL)  
Cell Culture Boot Camp (UoB)

## Process design, modelling and economics

Design of Experiments for Bioprocess Optimisation (UCL)  
Data Analytics, Machine Learning and AI for Biomanufacturing (UCL)  
Bioprocess Design and Economic Evaluation (UCL)  
Bioprocess Facility Design (UCL)  
Quality by Design for Effective Bioprocess Characterisation and Validation (UCL)  
Process Automation, Big Data and PAT (TU)  
Data Analytics 1: Introduction To Statistics (UoB)  
Data Analytics 2: Using R for Statistics (Online) (UoB)  
Data Analytics 3: How to Use Matlab/Prism (UoB)  
Python Essentials for Medicines Manufacturing (UoB)  
Demystifying Statistics and Mathematics for Bioscientists (TU)

## Analytical techniques

Flow Cytometry for Advanced Therapies (TU)  
Mass Spectrometry for Biopharmaceuticals (TU)  
Host Cell Protein Analysis (TU)

## Core GMP training

Fundamentals of GMP and Quality (UoB)  
Cleanrooms and GMP behaviours (UoB)  
GMP Equipment, Materials Handling, and Manufacturing Processes (UoB)  
Measuring and Documenting Quality, Risks, and Failures (UoB)  
Introduction to GMP & Quality for Medicines Manufacturing (TU)

## Specialist areas

Vaccine Bioprocess Development and Commercialisation (UCL)  
Cell and Gene Therapy Bioprocessing and Manufacture (UCL)\* **NEW**  
Antibody Targeted Therapies (UCL)\*  
Industrial Biotechnology: Sustainable Bioprocesses and Biorefineries (UCL)\*  
Manufacture of Cell and Gene Therapies (UCL)  
Introduction to Advanced Therapies Medicinal Products (UoB)  
Manufacturing Technologies for ATMP Production (UoB)  
Sustainable Medicines Manufacturing (UoB)

\* On-line courses

# Training examples

  modular training  
for the bioprocess  
industries

 **UNIVERSITY OF  
BIRMINGHAM**



 **RESILIENCE**  
UK Medicines Manufacturing  
Skills Centre of Excellence  
**TRAINING**



 **Teesside  
University**  **NATIONAL  
HORIZONS  
CENTRE**



Work Experience  
Training Courses



'Accelerator' for  
Returners



Leadership  
Accelerator



 **Roslin<sup>CT</sup>**



**INDUSTRY  
DEMOS**



 **MERCK**





**Eclipse Creator** Customized hands-on protocol training



**Accelerate**  
GMP clean room core behaviors



**4+**  
**VR/MR**  
applications in  
**Laboratories**



- Access to GMP labs anywhere
- Digital skills development
- Reduce training time and lab waste/plastics
- Scaling of training and talent pipeline
- Safe Space & Flexibility
- Prepare individuals to be 'facility-ready'
- 3000+ future talent have received hands-on training with cleanroom manufacturing equipment





**7r** bodyswaps



### Employability Skills

- Communication
- Leadership
- Teamwork
- Interview practice

True-to-life VR scenarios: step into various roles and experience different perspectives.



# Outreach examples



Schools  
Career  
Evenings



## LEARNING ACTIVITIES



National  
Careers  
Fair



School  
STEM  
Events



Conferences  
& Festivals

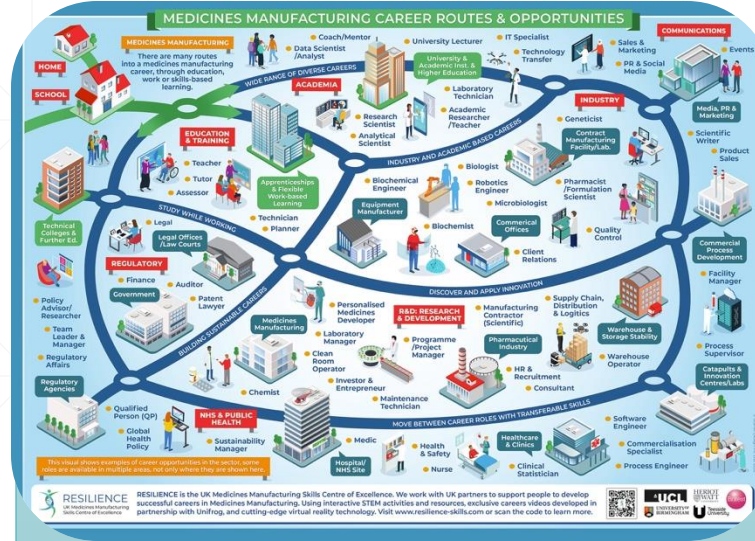


# RESILIENCE Resources



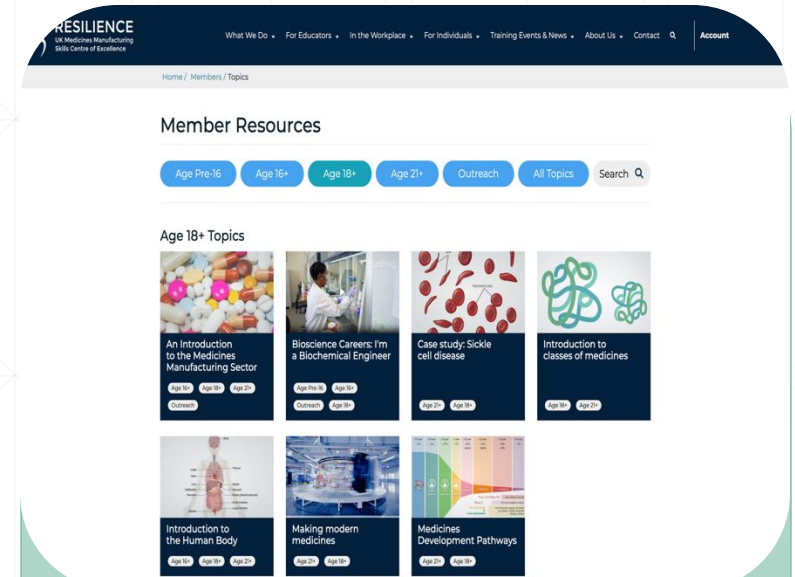
## Accelerator Programmes

Post-16; Apprenticeships;  
Undergraduate; Leadership  
(Postgraduate / Early Careers)



## Educational Materials

Lecture materials;  
Infographics; Workshops;  
Outreach materials



## Online Resources

UNIFROG videos; Mentoring;  
Apprenticeships; Careers;  
Hub support

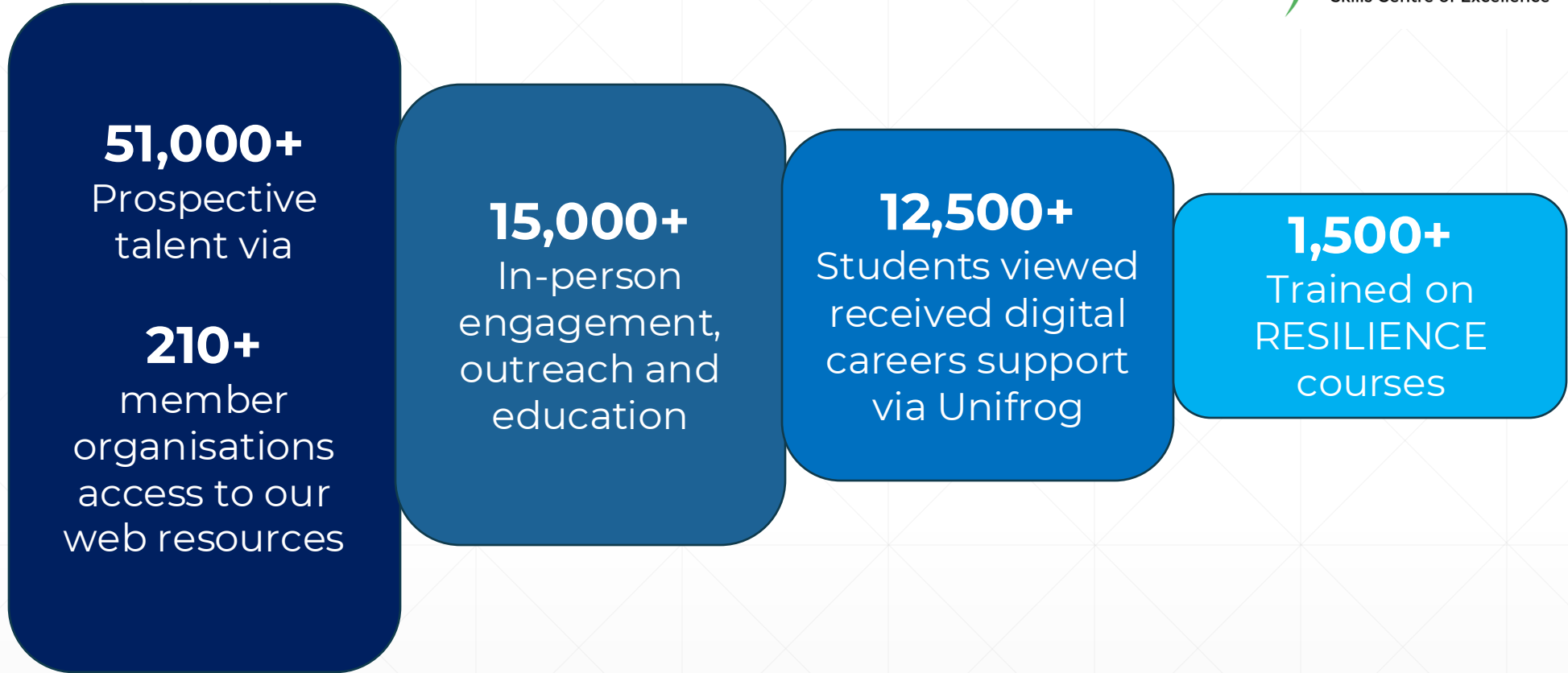
# RESILIENCE website – user organizations



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# Building and scaling the talent funnel



**Schools**  
**Colleges**  
**Universities**  
**Industry**

