University of Manchester Industry Club meeting

Wednesday 6th September 2023

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suzanne.m.embury@manchester.ac.uk

Purpose of today's meeting

- Introduce who we are: students (and staff)
  - Brief intro from me, who we are
  - Describe recent changes post-pandemic, Sean Bechhofer
  - Introduce our student software company, Suzanne Embury
- Outline ways to engage with and recruit our students
  - Briefly touch on ways to collaborate with staff and PG students
  - Short break
- Get feedback from you on digital credentials
  - also known as digital badges or microcredentials
  - What works and what doesn't, what would you, as an employer like to see?

Who are we: students

- One of the biggest and oldest departments Computer Science in UK, 1500 students (Bachelors, Masters and PhD)
- Over 10,000 degrees awarded in Computer Science
- Some firsts
  - Stored program computer (1948)
  - Floating point machine
  - First undergraduate degree in Computer Science (1965)
  - First use of virtual memory
  - SpiNNaker, million core neural HPC (2018)
  - www.cs.manchester.ac.uk/research/
- Typically around 250-300 undergraduate students graduate per year
  - bulge years closer to 450

Who we are: undergraduate students

Institute	UCAS entry tariff
University of Manchester	A* A* A*
University of Cambridge	A* A* A
University College London	A* A* A
Imperial College London	A* A* A
University of Oxford	A* A A

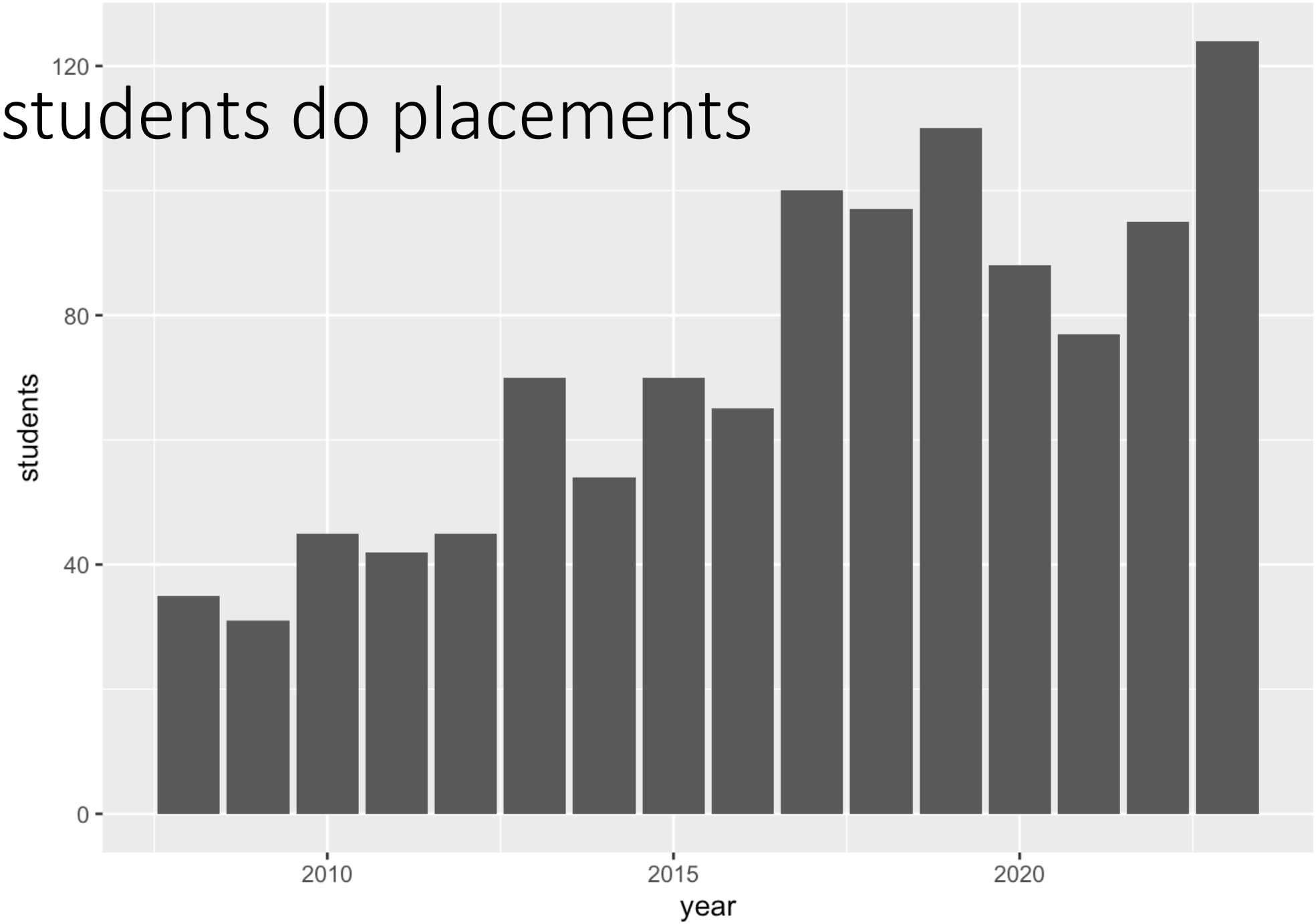
Table 4.6 Universities Targeted by Largest Number of Top Employers in 2022-2023

		*Ranking in 'Good University Guide' **
1.	Manchester	24
2.	Nottingham	30
3.	Birmingham	20
4.	Bristol	15
5.	Warwick	9
6.	Leeds	23
7.	London University College	7
8.	Cambridge	3
9.	Durham	6
10.	Southampton	16
11.	Oxford	1
12.	London King's College	26
13.	Exeter	13
14.	London School of Economics	4
15.	Edinburgh	10
16.	Bath	8
17.	London Imperial College	5
18.	London Queen Mary	36
19.	Sheffield	21
20.	Glasgow	14

Source - The Graduate Market in 2023

** The Times & Sunday Times Good University Guide 2023*

LOTS of students do placements



Where?

- Accenture, Agilent Technologies, Amazon, AND Digital, Apadmi, Arggo, ARM, Autodesk, AVL Powertrain, BAML, the BBC, Biorelate, BJSS, Bloomberg, BMW Mini, Bsquare Controls, BT, Cantarus, Celtra, CERN, Codethink, d3t, Elysian Systems, Feral Interactive, Fidelity, FiveAI, HMRC, IBM, Imagination Technologies, Intel, ISA Software, JP Morgan, Keysight Technologies, KPMG, Matillion, McAfee, Mentor Graphics, Monoprix, Morgan Stanley, NCC Group, Nokia, Nomura, Novacoast, Ocado, PA Consulting, PwC, Schlumberger, ServiceNow, Siemens, Soda Software, SteamaCo, The Hut Group, The Start Up Factory, Uber, Visa and Vodafone etc

Lots of students do internships too

- But how many?
- Learning professional skills we can’t teach
- Do better final years (e.g. proposing own projects)
- Get better and higher paid jobs when they graduate
- Snowball effect, teaching each other (PASS)

Hearing your Future podcast, case studies 🎧

Koderly, CERN, Morgan Stanley, Google, Disney Plus, Wise, McKinsey, Matillion, Barclays, Publicis Sapient, THG, Moneysupermarket, Infinityworks, Amazon Web Services, ARM, Nomura, Bloomberg and Palantir www.cdyf.me/hearing

Ranking by GPA against the sector

Overall... **11th** joint with Glasgow (out of 90 institutions)

Based on REF 2022

Questions?

- Over to Sean and then Suzanne

CS Industry Club

Sean Bechhofer, Discipline Head of Education
Department of Computer Science
sean.bechhofer@manchester.ac.uk

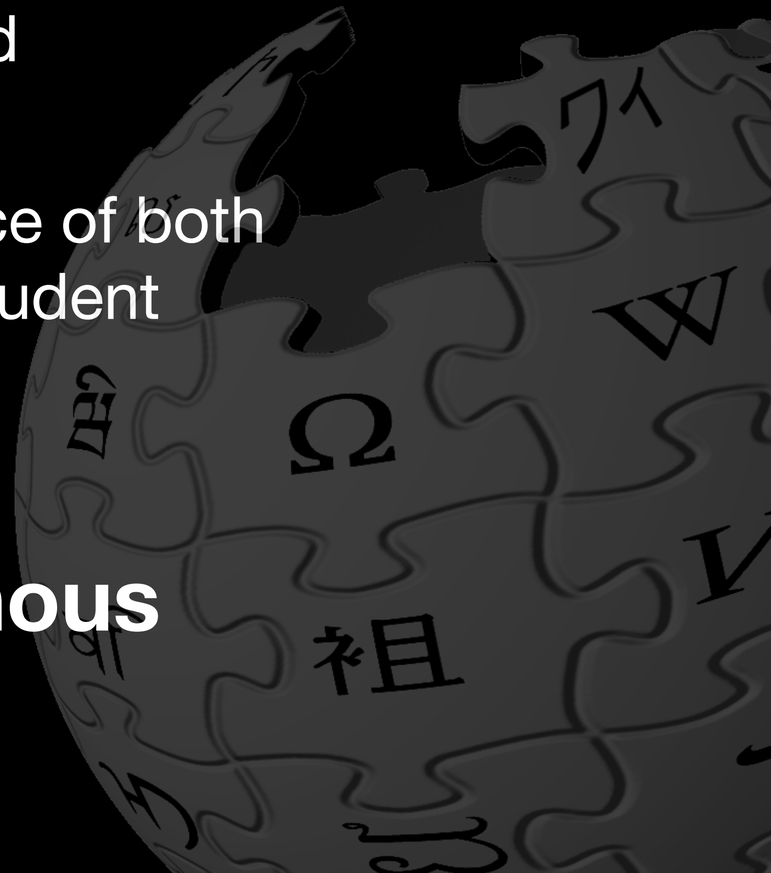
In 2019…

https://www.flickr.com/photos/defenceimages/8675799490

Blended Learning

Blended learning is an approach to education that combines online educational materials and opportunities for interaction online with physical place-based classroom methods.

Blended learning requires the physical presence of both teacher and student, with some elements of student control over time, place, path, or pace.



Asynchronous and **Synchronous** Activities

Blended Learning

Asynchronous

Video

Directed Reading

Self Test Quiz

Coursework Assessment

Peer Discussion

Synchronous

Traditional Lecture

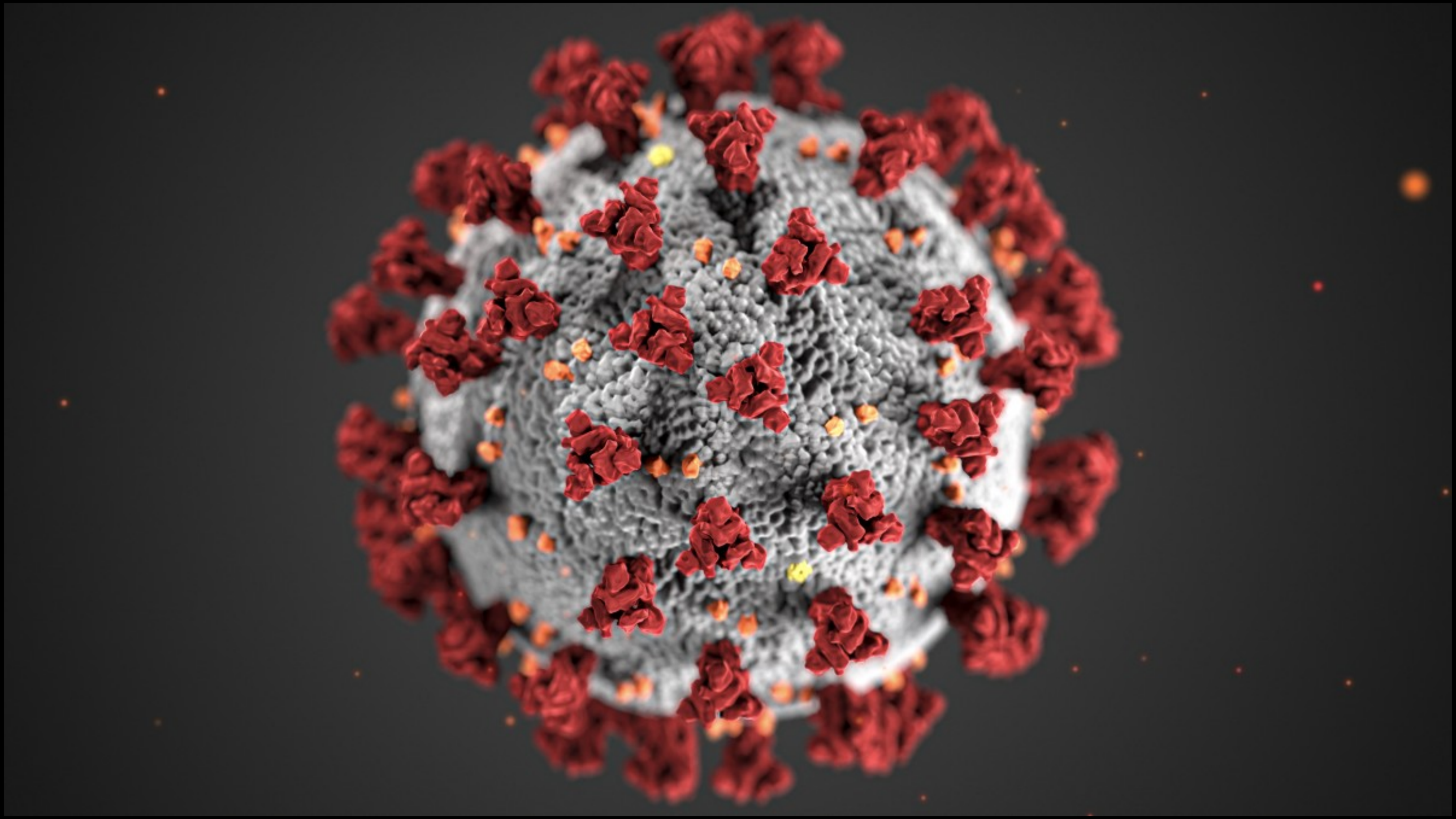
Tutorial

Examples Class

Lab

Coursework Assessment

Office Hour



COVID Timeline

19-20

Online from March

Largely ad-hoc transition

No Semester 2 exams: global “mit circs”

20-21

All online

Blended Approach

Synchronous activities via Zoom/BB

VM to support students

21-22

Semester 1 online option (~20%)

All back on campus in January 2022 for exams and Semester 2 teaching

Blended Learning

Blended learning is an approach to education that combines online educational materials and opportunities for interaction online with physical place-based classroom methods.

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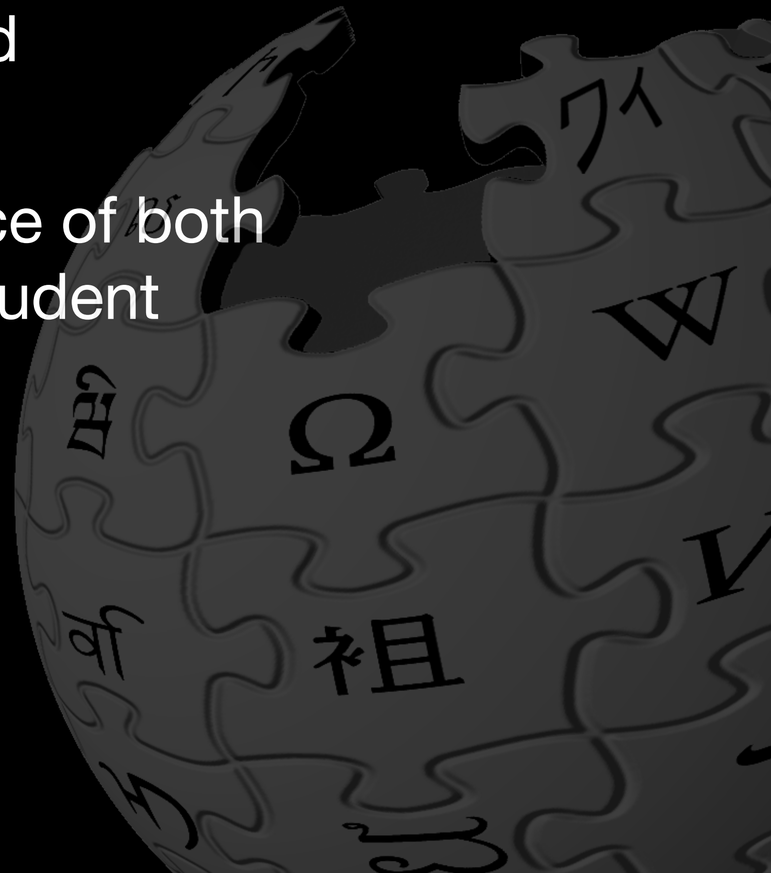
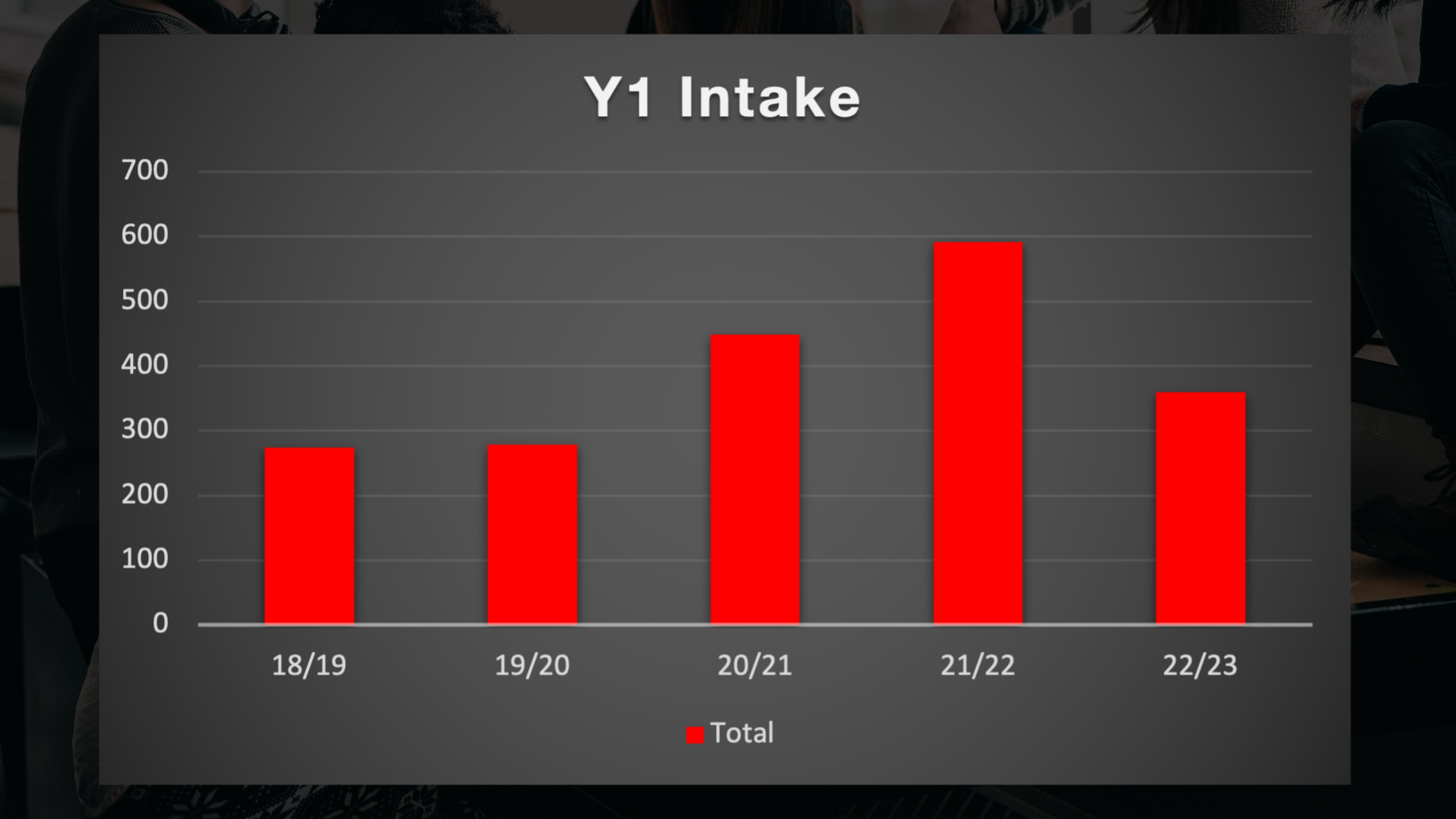
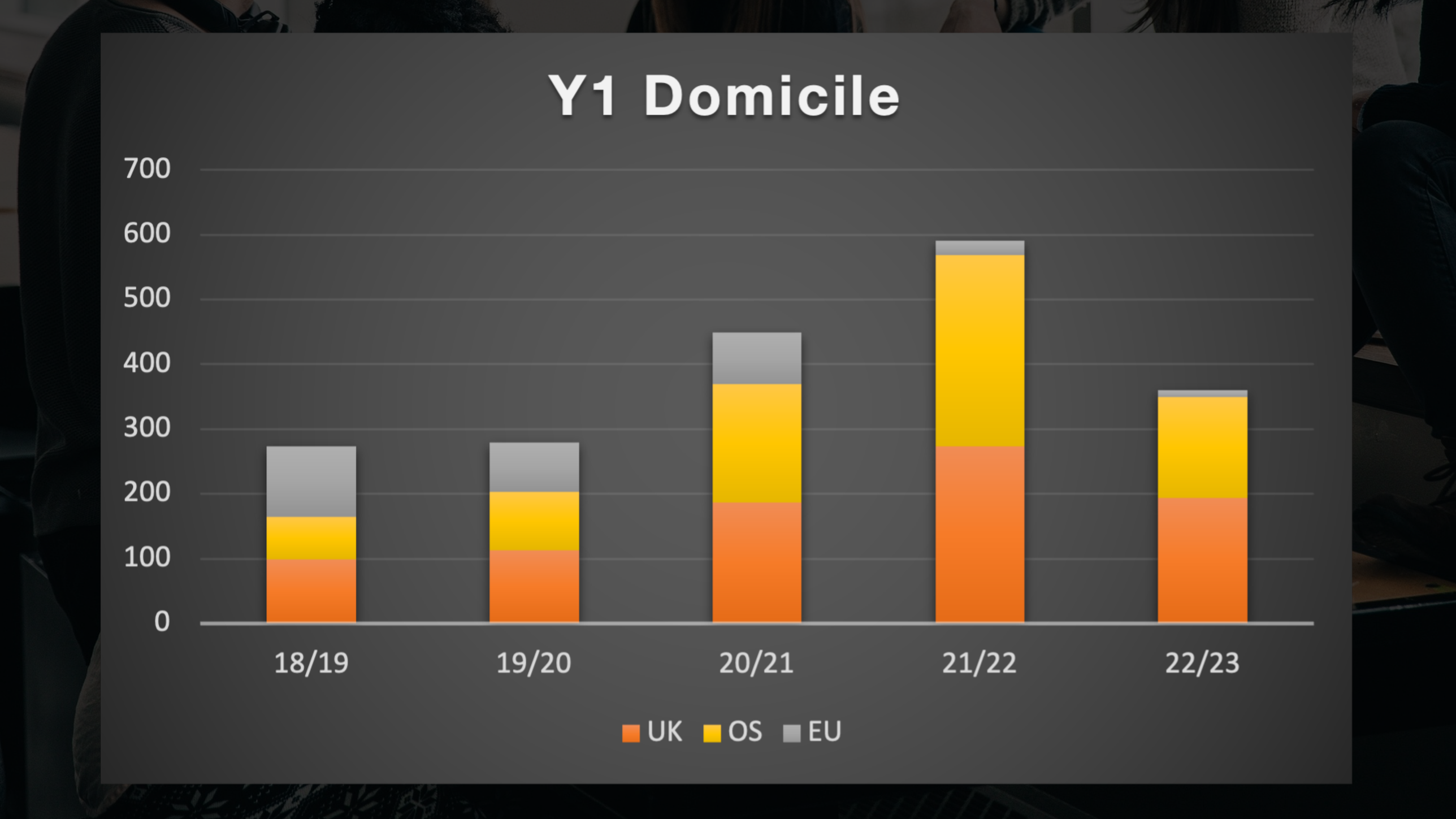


Cohorts


Y1 Intake
700
600
500
400
300
200
100
0
18/19
19/20
20/21
21/22
22/23
Total


Y1 Domicile
700
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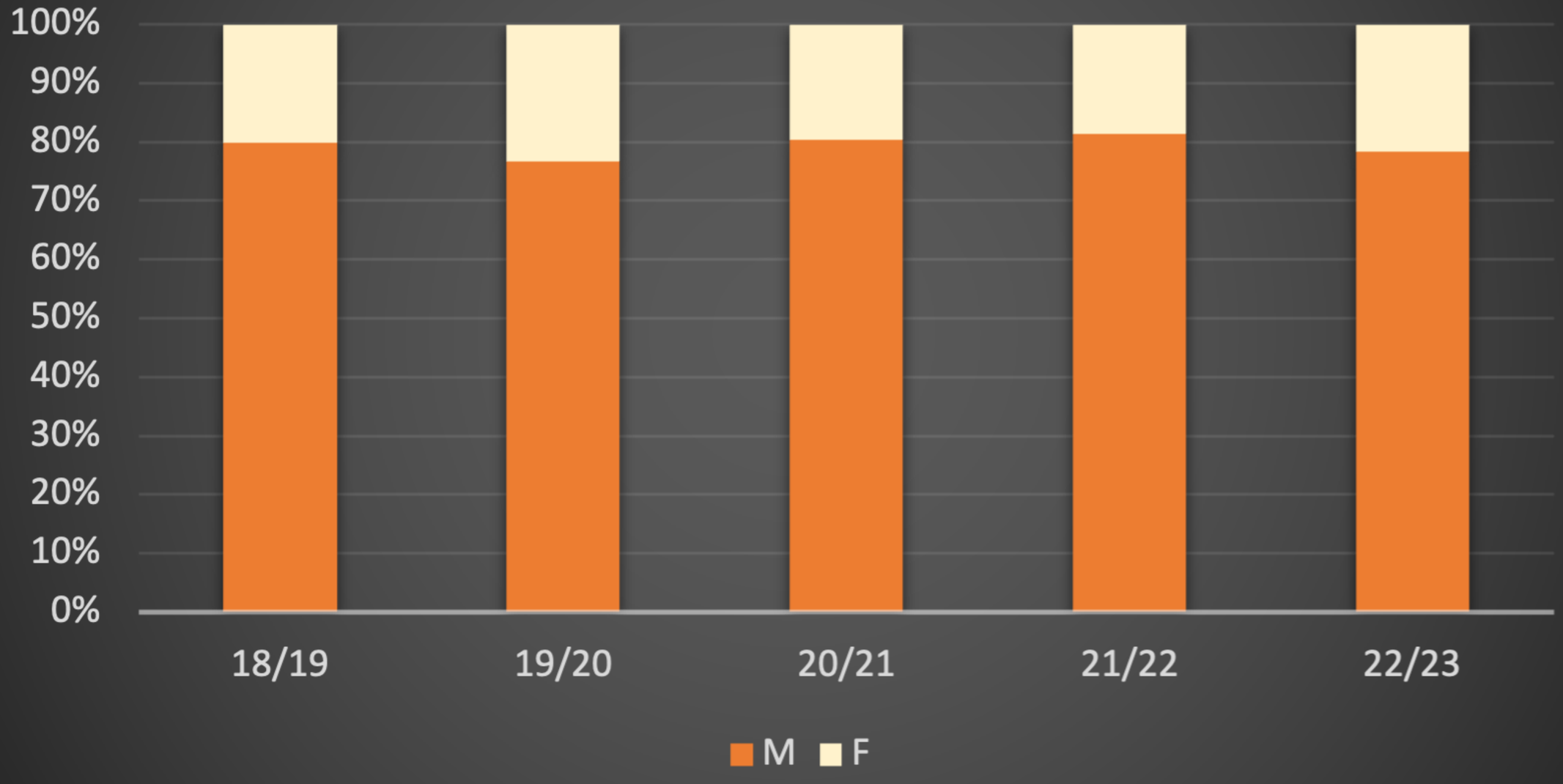
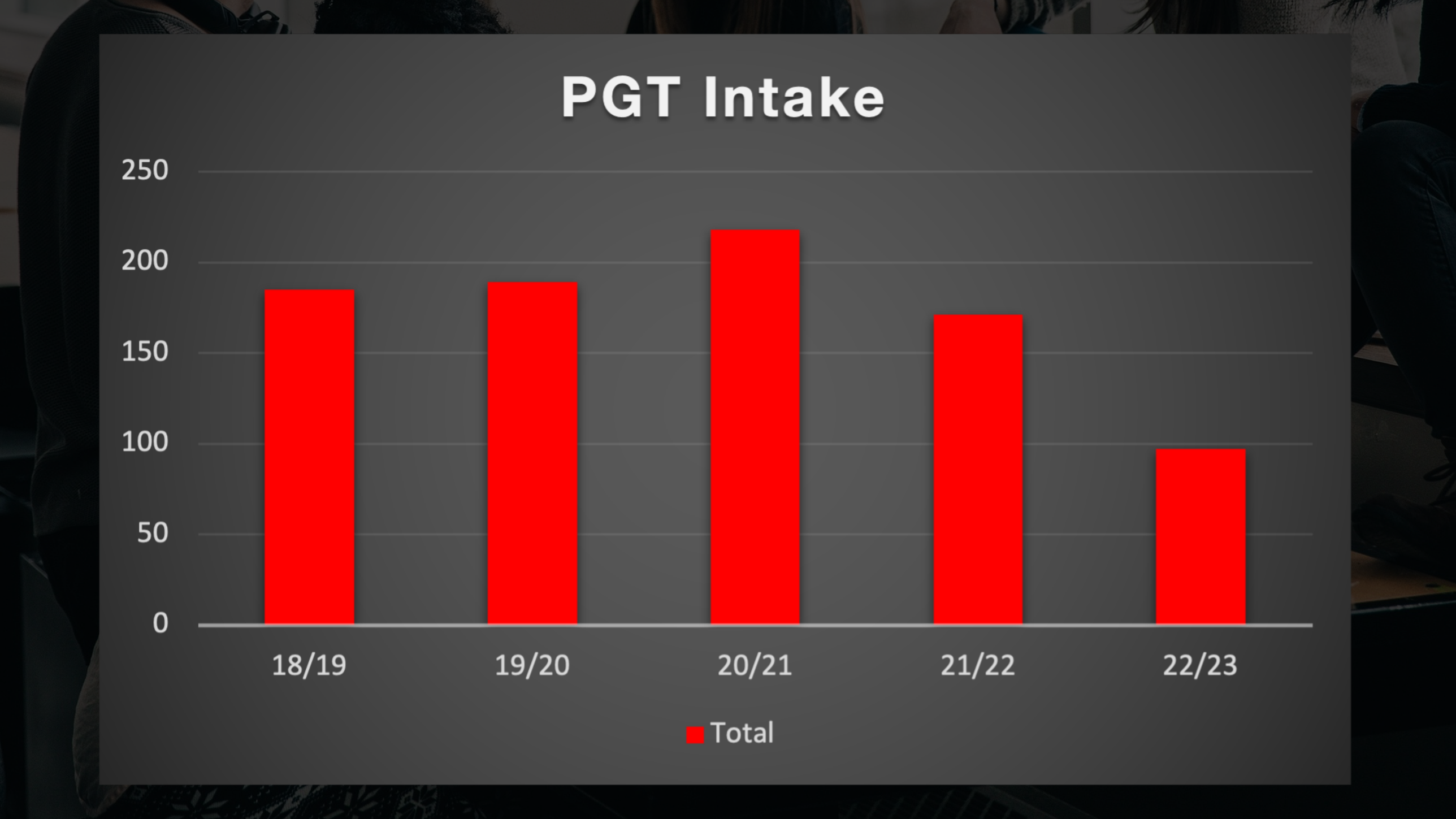
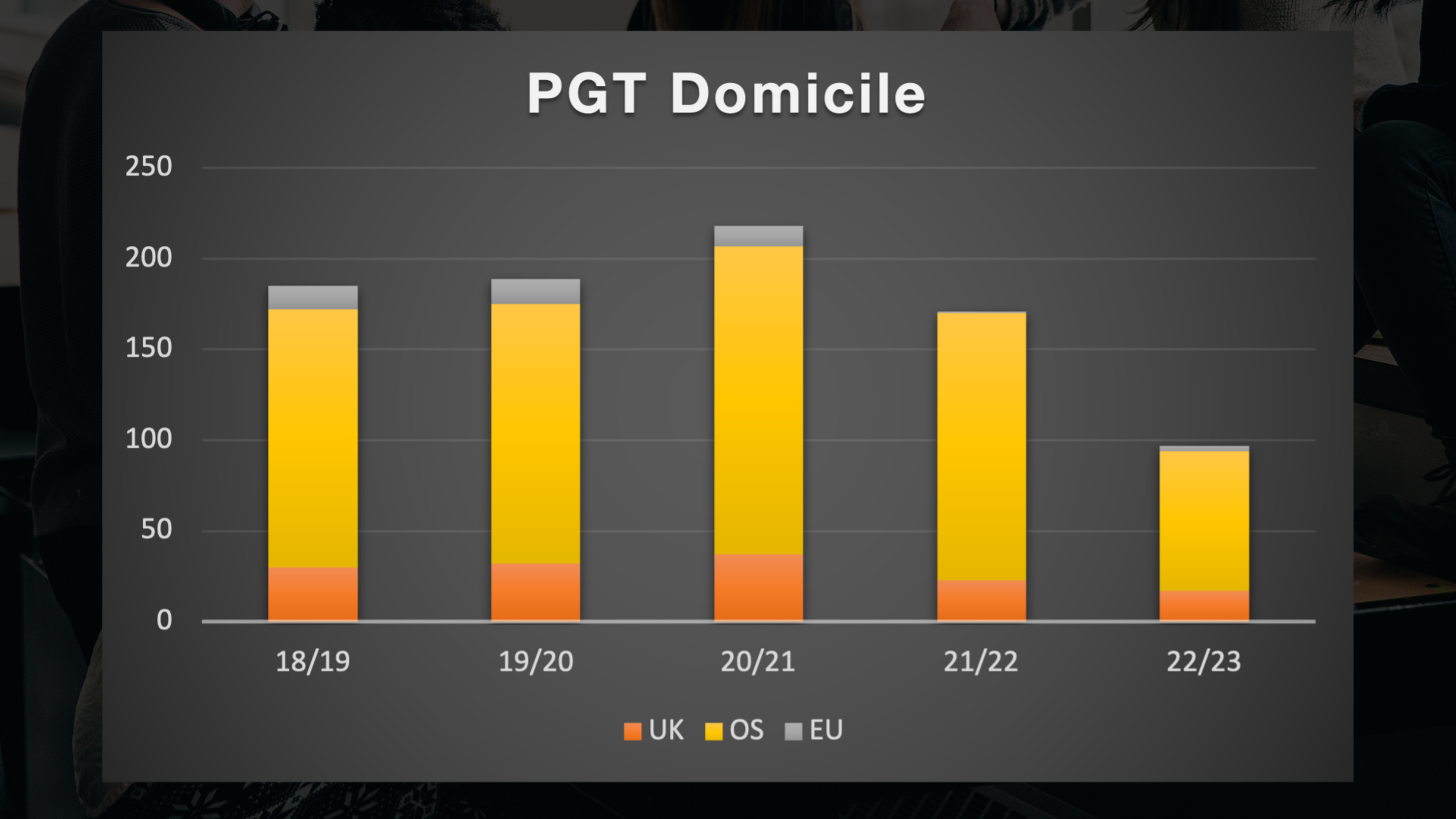
18/19
19/20
20/21
21/22
22/23
UK
OS
EU

Y1 Gender




PGT Intake
250
200
150
100
50
0
18/19
19/20
20/21
21/22
22/23
Total


PGT Domicile
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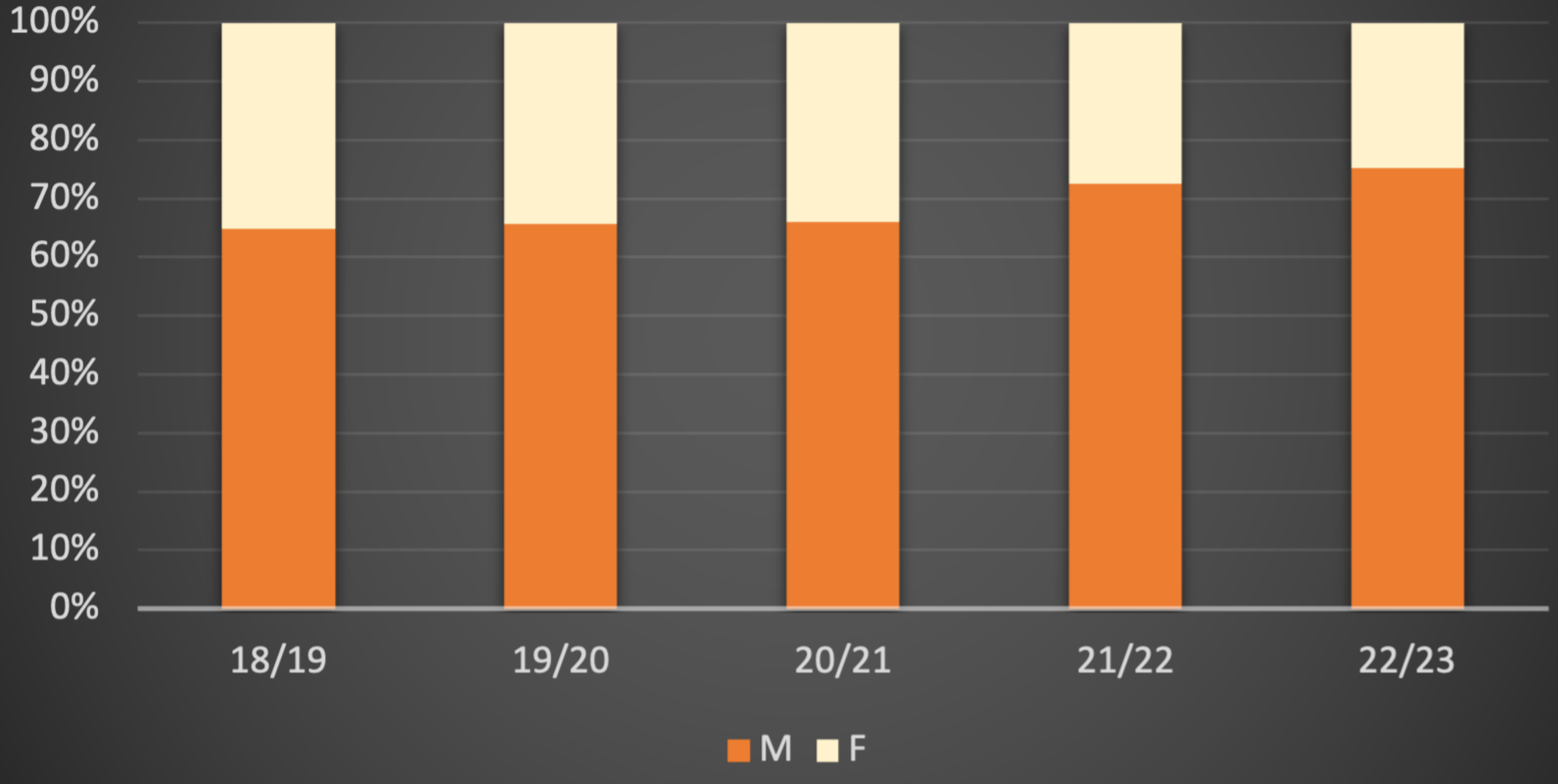
PGT Gender



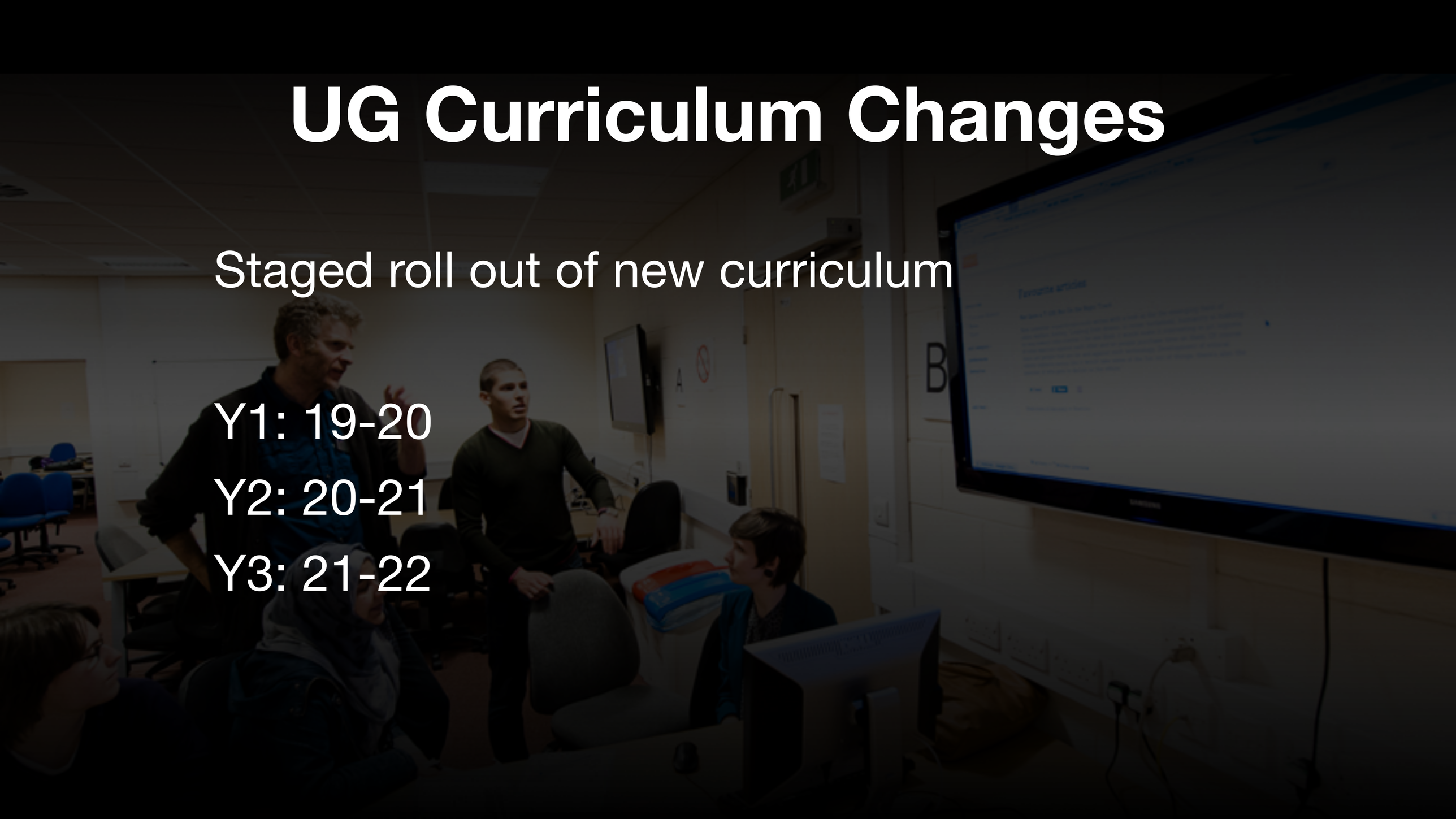
UG Curriculum Changes

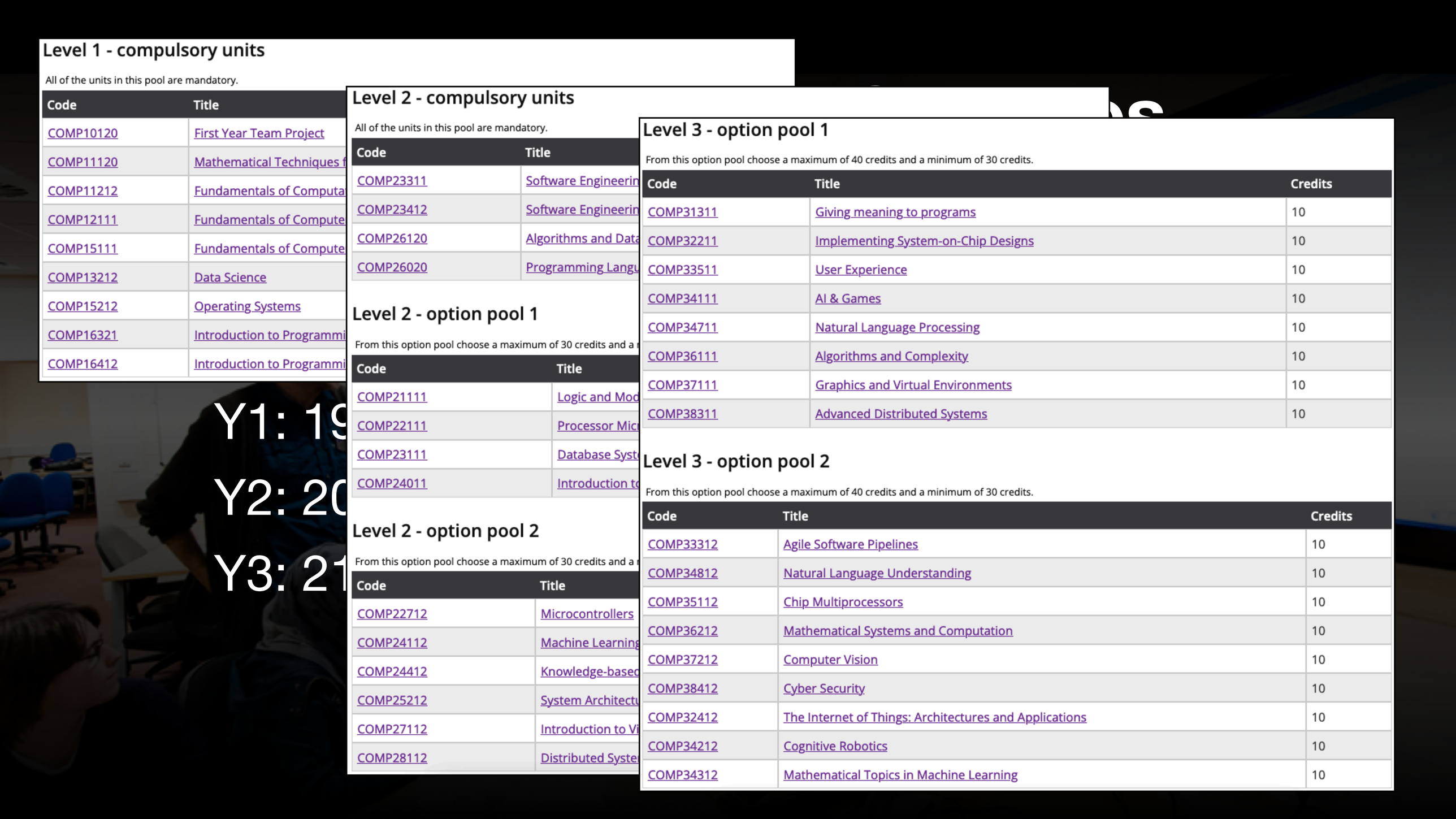
Staged roll out of new curriculum

Y1: 19-20

Y2: 20-21

Y3: 21-22





Level 1 - compulsory units

All of the units in this pool are mandatory.

Code	Title
COMP10120	First Year Team Project
COMP11120	Mathematical Techniques f
COMP11212	Fundamentals of Computa
COMP12111	Fundamentals of Compute
COMP15111	Fundamentals of Compute
COMP13212	Data Science
COMP15212	Operating Systems
COMP16321	Introduction to Programmi
COMP16412	Introduction to Programmi

Y1: 19

Y2: 20

Y3: 21

Level 2 - compulsory units

All of the units in this pool are mandatory.

Code	Title
COMP23311	Software Engineerin
COMP23412	Software Engineerin
COMP26120	Algorithms and Data
COMP26020	Programming Langu

Level 2 - option pool 1

From this option pool choose a maximum of 30 credits and a

Code	Title
COMP21111	Logic and Mod
COMP22111	Processor Mic
COMP23111	Database Syst
COMP24011	Introduction t

Level 2 - option pool 2

From this option pool choose a maximum of 30 credits and a

Code	Title
COMP22712	Microcontrollers
COMP24112	Machine Learning
COMP24412	Knowledge-based
COMP25212	System Architectu
COMP27112	Introduction to Vi
COMP28112	Distributed Syste

Level 3 - option pool 1

From this option pool choose a maximum of 40 credits and a minimum of 30 credits.

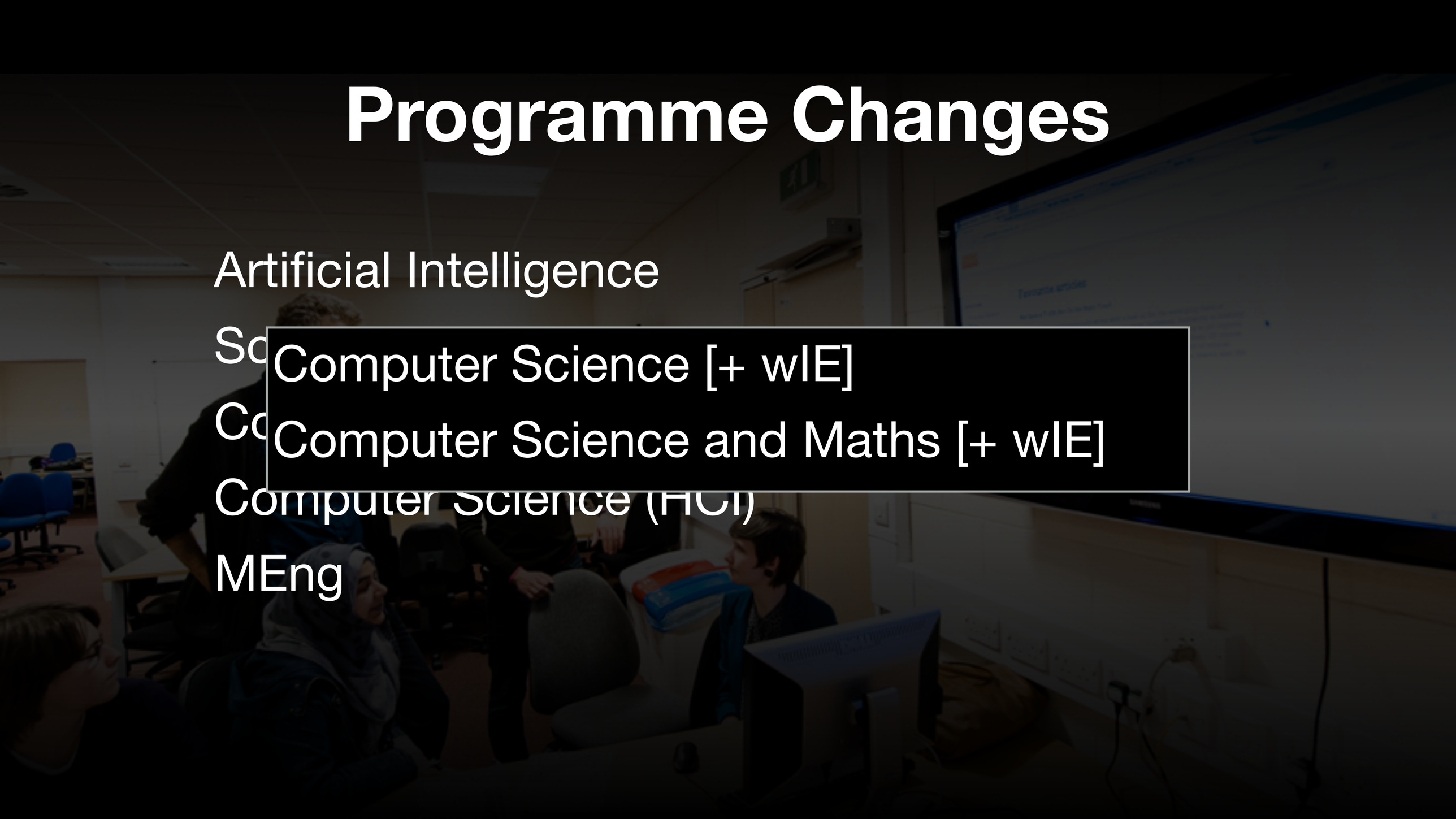
Code	Title	Credits
COMP31311	Giving meaning to programs	10
COMP32211	Implementing System-on-Chip Designs	10
COMP33511	User Experience	10
COMP34111	AI & Games	10
COMP34711	Natural Language Processing	10
COMP36111	Algorithms and Complexity	10
COMP37111	Graphics and Virtual Environments	10
COMP38311	Advanced Distributed Systems	10

Level 3 - option pool 2

From this option pool choose a maximum of 40 credits and a minimum of 30 credits.

Code	Title	Credits
COMP33312	Agile Software Pipelines	10
COMP34812	Natural Language Understanding	10
COMP35112	Chip Multiprocessors	10
COMP36212	Mathematical Systems and Computation	10
COMP37212	Computer Vision	10
COMP38412	Cyber Security	10
COMP32412	The Internet of Things: Architectures and Applications	10
COMP34212	Cognitive Robotics	10
COMP34312	Mathematical Topics in Machine Learning	10

Programme Changes



Artificial Intelligence

Sc

Co

Computer Science (HCI)

MEng

Computer Science [+ wIE]

Computer Science and Maths [+ wIE]

UG Programme Changes

Artificial Intelligence

Sc

Co

Computer Science (HCI)

MEng

Unaccredited exit awards

BSc (Hons) Computing - Computer Science

PGT Programme

Programme Review

Specialised Programmes

ACS, AI, ML, SE, Cyber Security

60 Credit project

Imago: the UoM Student Software Company

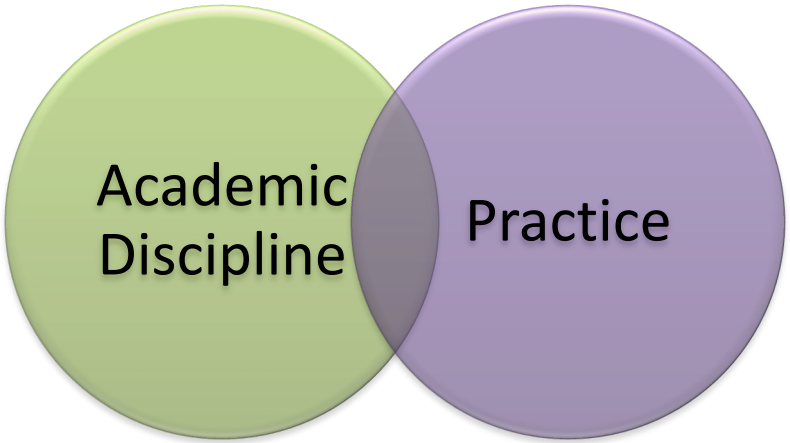
Suzanne M. Embury, Jan Machacek, Noriko Griffiths,
Thomas Carroll, Ben Possible (Dept of Computer Science)

Aldo Segura (Innovation Factory)

suzanne.m.embury@manchester.ac.uk

https://imago.cs.manchester.ac.uk/

What is a Student Enterprise/ Company?



Examples:

- Music
- Architecture
- The Manchester Innocence Project (legal)
- Manchester Q-Step Centre (quant social science)
- Genesys (The University of Sheffield)
- Beautiful Canoe (Aston University)

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Imago: a Pop-Up Software House in the Heart of the University

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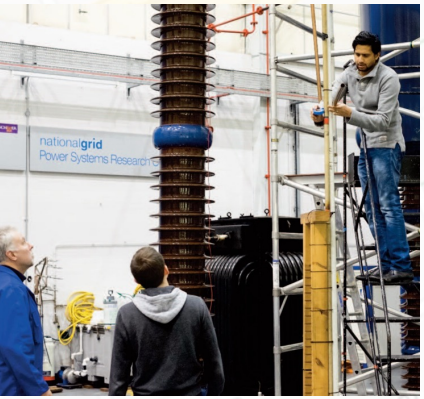
The University of Manchester



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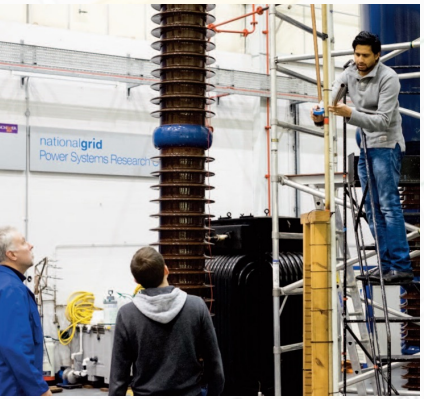

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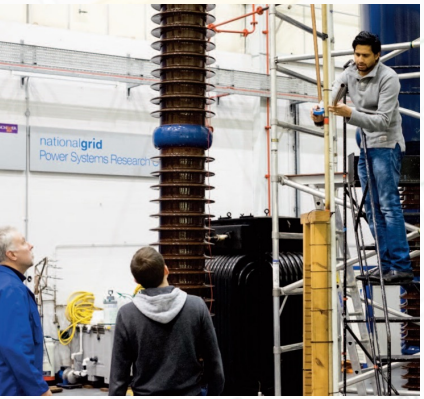




Imago Software

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How does it work?

Academic/
Researcher

Imago Academic

Imago Industry
Partner

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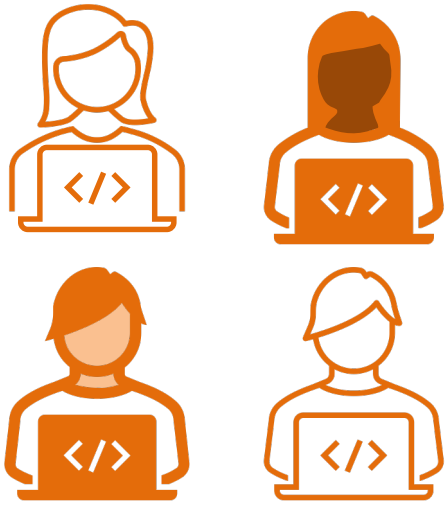
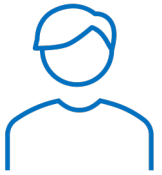
How does it work?

Academic/ Researcher



Imago Student Team

Academic Coach



Industry Mentor

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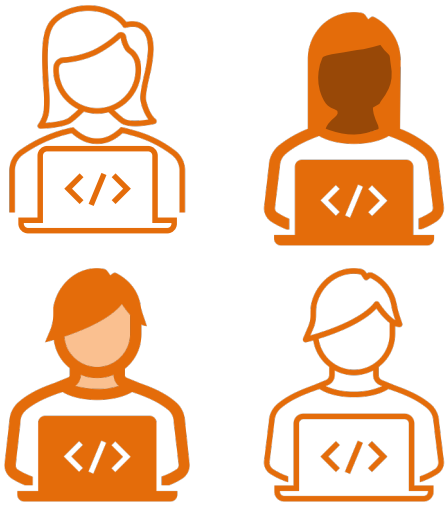
What do clients pay for?



Imago Student Team's Salary

Academic Coach's Time

Contribution to Cloud-Based Dev Environment

Contribution to Equipment Costs

University Overheads (external projects only)

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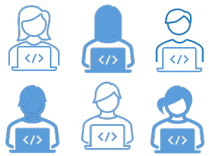
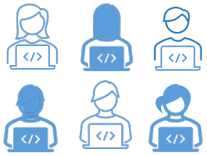
The Imago Year

Workshops



Social Events

Networking



Advisory Board Office Hours

Blogs/Videos

Training

Pitches & presentations

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Supergen Bioenergy Hub

Jang Belche (Y1)

Business Analyst

Karam Agha (Y2)

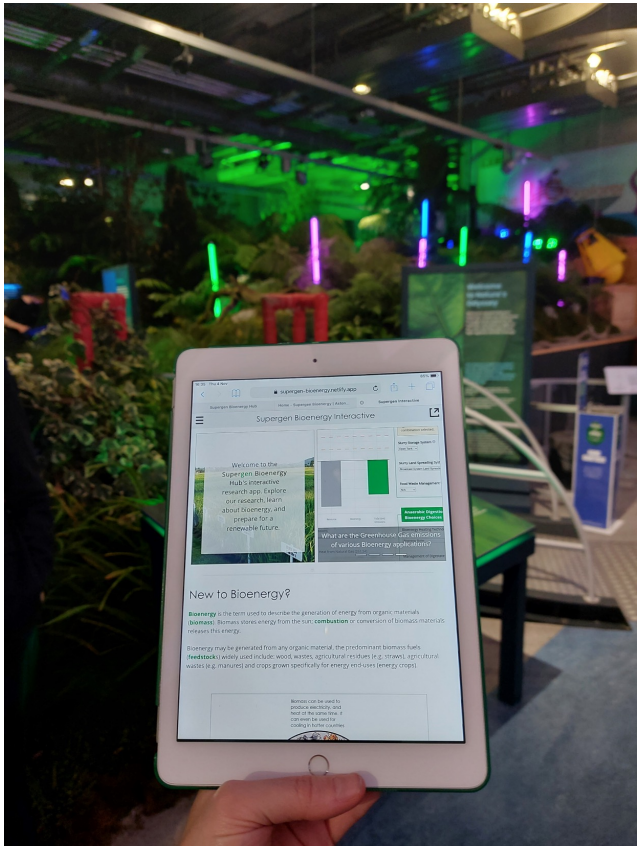
Quality Engineer

UX Engineer

Miranda Watkins (Y1)

Technical Architect

Amish Shah (Y1)



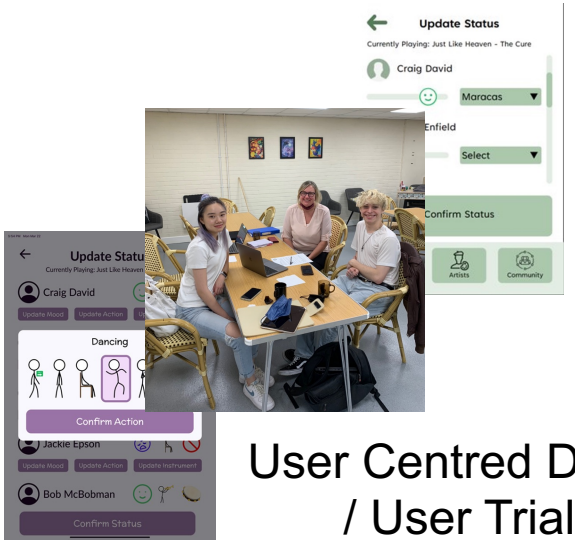
App used at COP26

supergen-bioenergy.netlify.app/

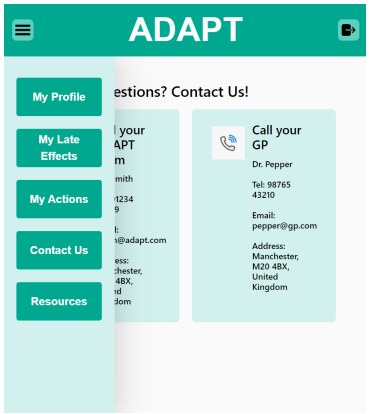
Project Types

Open Source Software Workshops

5 Day Design Sprints



User Centred Design / User Trials



Hi-Fidelity MVPs

Code Base Hardening

Preparing to Open Source

Imago: UoM Student Software Company

suzanne.m.embury|jan.machacek@manchester.ac.uk

https://imago.cs.manchester.ac.uk/

https://www.youtube.com/channel/UCfLyZawx2rSy21hph8hOImg

Acknowledgements
This work is supported by the Institute of Coding, funded by the Office of Students (OfS) and the Higher Education Funding Council for England (HEFCE).

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Project Models

Full time for 10-13 weeks
4 person team
Indicative internal costing:
£22K (10 wks), 26K (13 wks)

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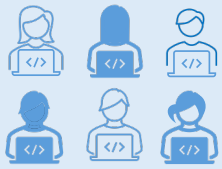
Project Models



Part time for 10 weeks
6 person team
Indicative internal costing: £9K

Autumn Semester | Xmas Vacation + January Exams | Spring Semester + Easter vacation | May/June Exams | Summer Vacation

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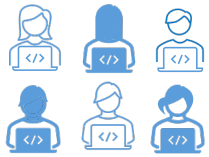
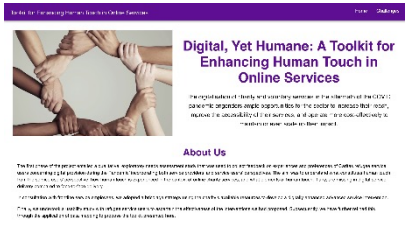
Project Models

Part/full time for 10-13 weeks
6 person team
Indicative internal costing:
£9K-£13K



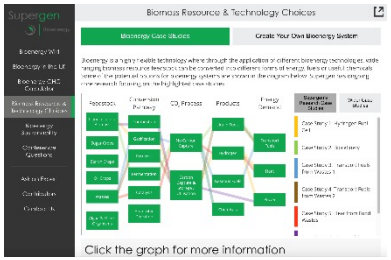
Autumn Semester | Xmas Vacation + January Exams | Spring Semester + Easter vacation | May/June Exams | Summer Vacation

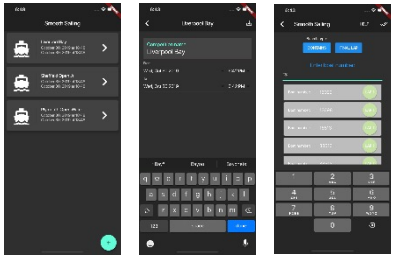
Our Portfolio



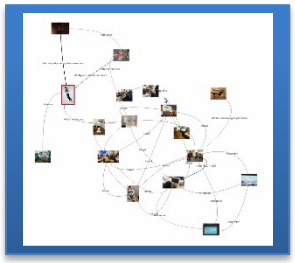
Caritas/AMBS

Supergen Bioenergy Hub / MACE

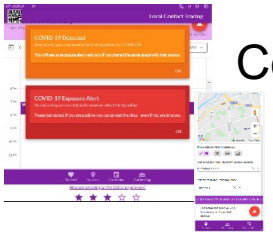




Smooth Sailing App

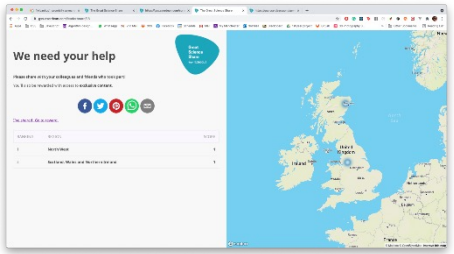


Cohere / Manchester Institute for Education



Covid Contact Tracer / AMBS

Ancient Egypt Game / Manchester Museum



Feedback Tool / SEERIH

Flexible Learning Course Manager

Ways to engage with students: early & often

- Guest lectures in first year (February to June)
- Careers fairs, next Computing careers fair is 8th November
  - Email duncan.hull@manchester.ac.uk
- Software engineering mentoring scheme
  - www.cs.manchester.ac.uk/connect/business-engagement/industrial-mentoring/
- Student societies, especially UNICS unicsmcr.com
- Advertising your vacancies


Press ENTER to mark as answered
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ABOUT ME
Final year CompSci
AWS Intern
Student trainer
• 3+ years
• 400+ attendees
Ask me anything
No questions from the audience!


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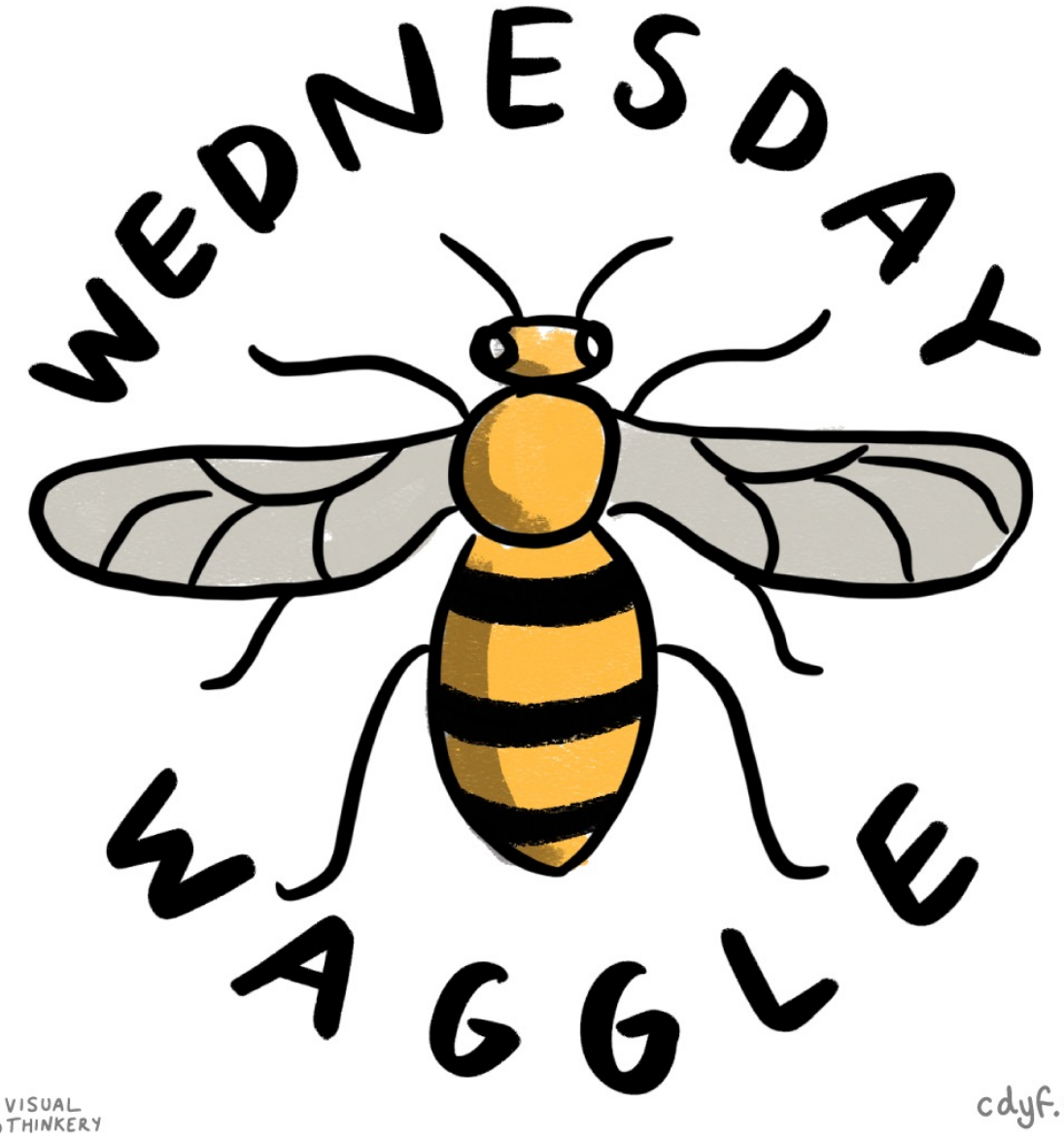
software-eng.netlify.app/mentoring

Student Societies: UNICS unicsmcr.com

- GreatUnihack greatunihack.com (28/29th October 2023)
- StudentHack studenthack.com (Spring 2024)
- Email contact@unicsmcr.com

Advertising vacancies

- Bewildering array of places for students to look at cdyf.me/finding
- We *summarise* via a weekly newsletter called the Wednesday Waggle



Collaborating with staff and PG students

- Bachelors projects / Masters projects, some scope for co-supervision
- PhD projects – more scope for collaboration
- Knowledge Transfer Partnerships (KTPs) www.ktp-uk.org
- Impact Acceleration Accounts (IAAs) via www.ukri.org

MANCHESTER 1824
The University of Manchester

Kyriaki Georgiou

WELCOME

Kyriaki Georgiou

Our new KTP Associate

Kyriaki joins The University of Manchester and Simsol (Simulation Solutions) as a Computer Vision & Machine Learning Engineer.

The aim of this 24-month project is to develop, embed and exploit novel Image Processing and Deep Learning techniques to enable real-time classification of features and defects in plate glass manufacturing processes.

UKRI Innovate UK

www.manchester.ac.uk/ke

SIMSOL

Questions?

- break

Digital badges: UNESCO

- *a record of focused learning achievement verifying what the learner **knows**, **understands** or **can do***

- *Includes **assessment** based on **clearly defined standards** and is awarded by a trusted provider*

Digital credentials & microcredentials

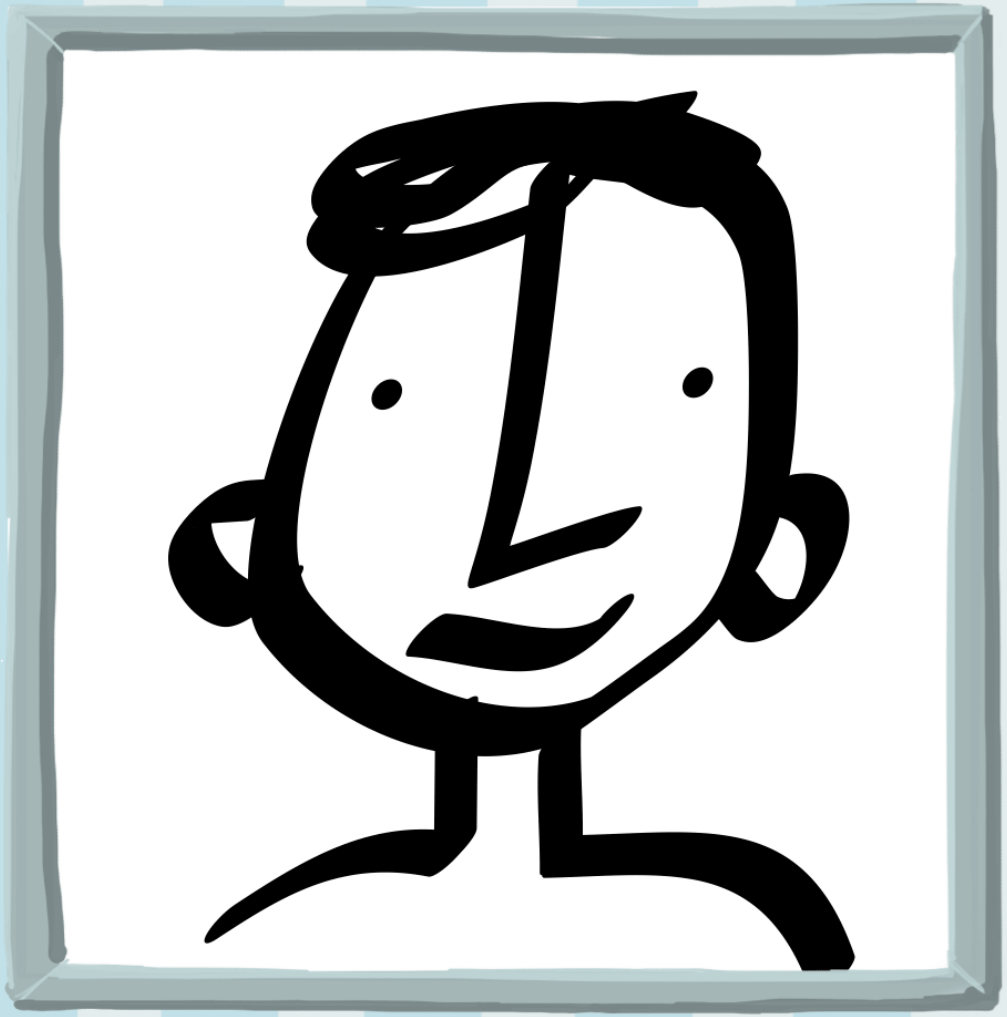
- Either curricular (credit bearing) or co-curricular
- Usually DIGITAL credential (not paper)
- Often demonstrate personal and social skills above and beyond degree classification, not just technical

A CERTIFICATE IS JUST AN OFFLINE BADGE...

THOUGHT: DOUG BELSHAW

@bryanMMathers

BROAD BRUSHSTROKES



FINE DETAIL

@bryanMMathers

OPEN BADGES PAINT A BETTER PICTURE...

I AM MORE THAN JUST MY GRADES

- HONESTY
- INTEGRITY
- DETERMINATION
- CHARACTER
- SENSE OF HUMOUR
- COLLABORATION
- ENTHUSIASM
- WORK ETHIC
- CREATIVITY
- KINDNESS
- HUMILITY
- CHARITY

@bryanMMathers

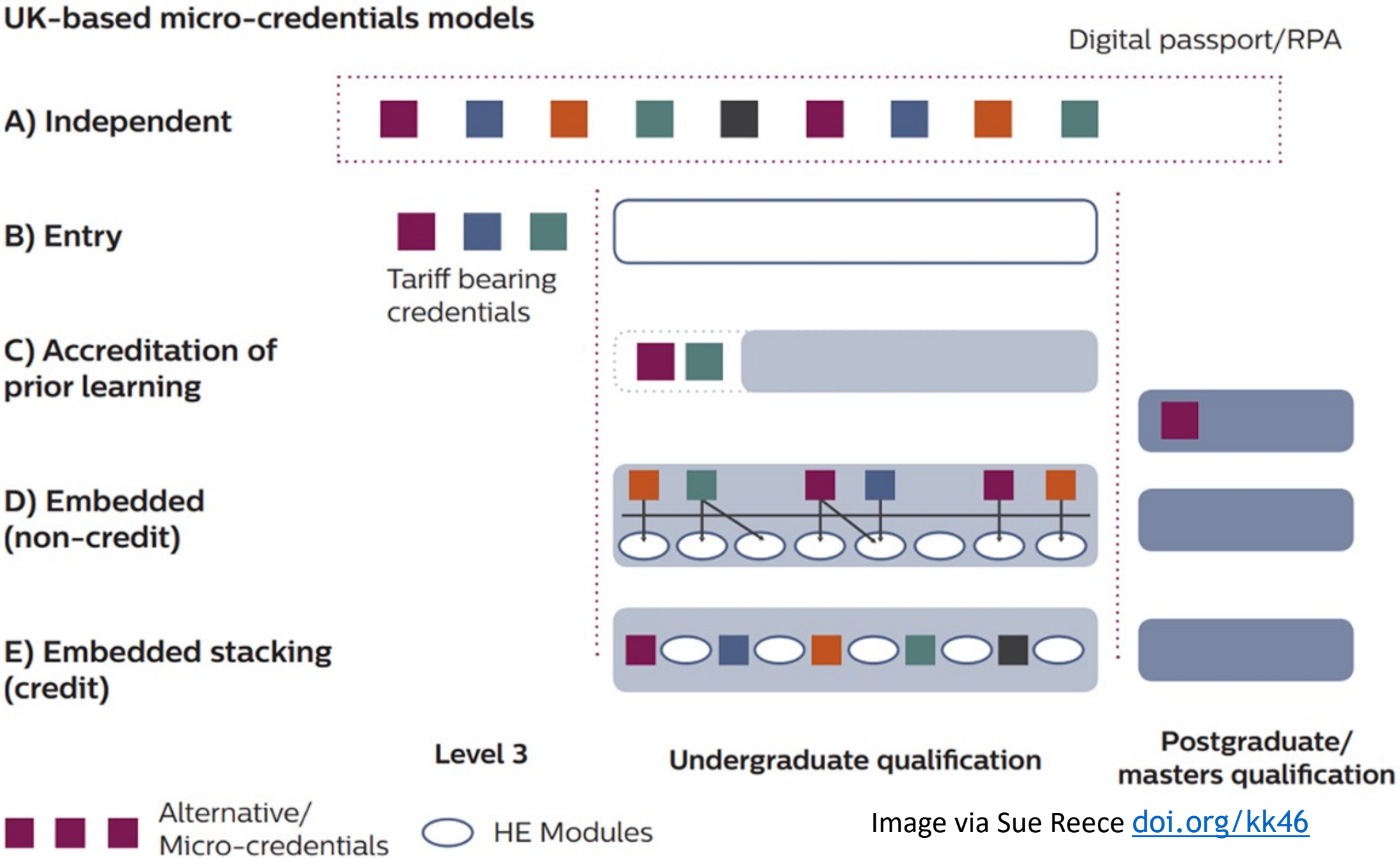


Image via Sue Reece [doi.org/kk46](doi.org/kk46)

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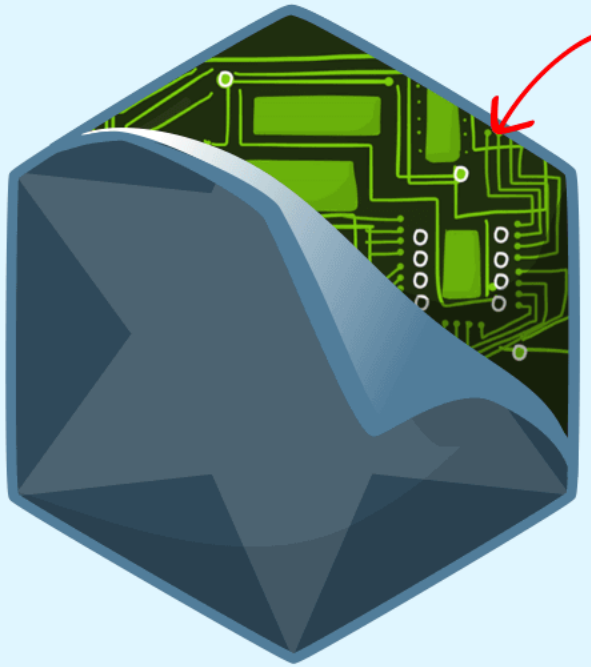
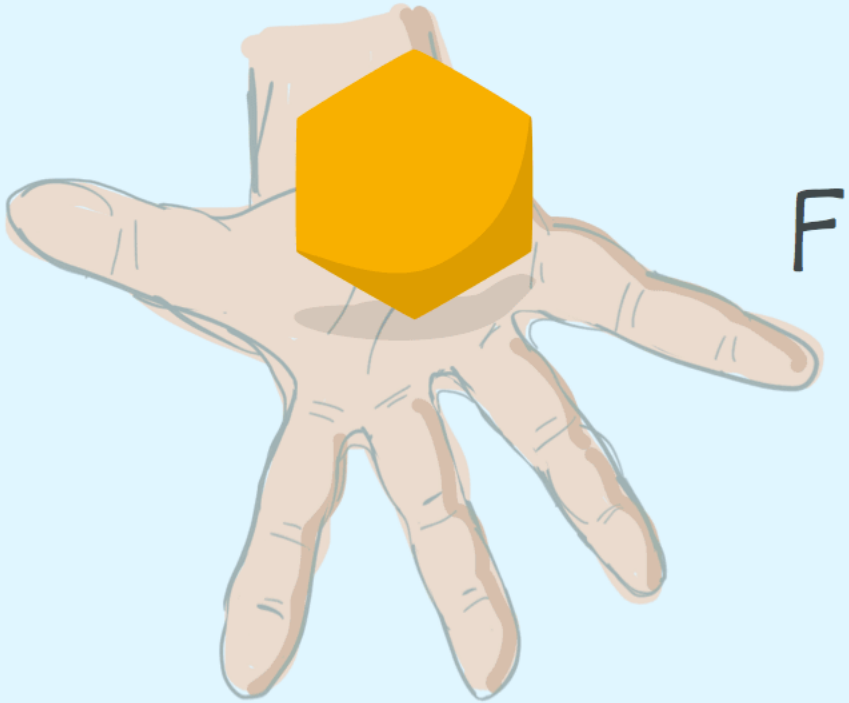
City & Guilds Group

@bryanMMathers



Evidence based



Free & Open

Stackable

Transferable

@bryanMMathers

Open Badges

THERE'S DATA INSIDE!

- badge name
- badge URL (description)
- badge criteria
- badge image
- issuer
- issue date
- recipient
- tags
- alignment (standards)
- expiration date
- evidence URL

City & Guilds

e.g. PASS leader badge

800+ badges in 5 years

Some examples from Higher Education

- Stellify www.stellify.manchester.ac.uk
  - … and digital badges in Computer Science
- Loughborough www.lboro.ac.uk/students/personal-best
- MMU rise.mmu.ac.uk/courses/the-idea-award see idea.org.uk
- See also Huddersfield, Bath, Northumbria etc doi.org/kk46

Understand the issues that matter

Read more >

Complete at least two Ethical Grand Challenge activities:

Sustainability Challenge
(Year 1)

Social Justice Challenge
(Year 2)

Workplace Ethics Challenge
(Year 3, final year)

Make a difference

Read more >

Complete 25 hours of volunteering which benefits the wider community:

Find a volunteering opportunity on Volunteer Hub or find your own.

You must record all your own volunteering activity on Volunteer Hub to count towards the award.

Step up and lead

Read more >

Complete two approved leadership roles (or one role for two years):

View our list of approved leadership roles and how to apply on the link above.

Technical examples

Big challenges for small credentials

- For learners and earners: Making it personal, what do they value?
- For educators: Making it scale and balancing granularity
- For educators: Integrating into curriculum, integrating with employers
- For employers: Making it relevant, what do employers want?
  - What helps you recruit, retain, develop and upskill employees?
  - Particularly early career

- Credentials to Employment: The Last Mile
  - digitalcredentials.mit.edu/docs/Credentials-to-Employment-The-Last-Mile.pdf

Consultation questions part 1

- In your organization, which digital credentials (microcredentials) are most important for early career professionals?
- What knowledge, understanding, skills and competencies are they awarded for?
- What are their strengths?
- What are the weaknesses?
- Any other comments?

Consultation questions 2: Fantasy badges

- What credentials would you like to see in graduates and early career professionals?
- What knowledge, understanding, skills and competencies does this badge (or badges) recognize
- Why doesn’t this badge exist yet?
- Any other comments or suggestions?

Acknowledgements

- Artwork by Bryan Mathers
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