

University of Manchester Industry Club meeting

Wednesday 6th September 2023

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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
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University of Manchester	A* A* A*
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University of Cambridge	A* A* A
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University College London	A* A* A
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Imperial College London	A* A* A
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University of Oxford	A* A A
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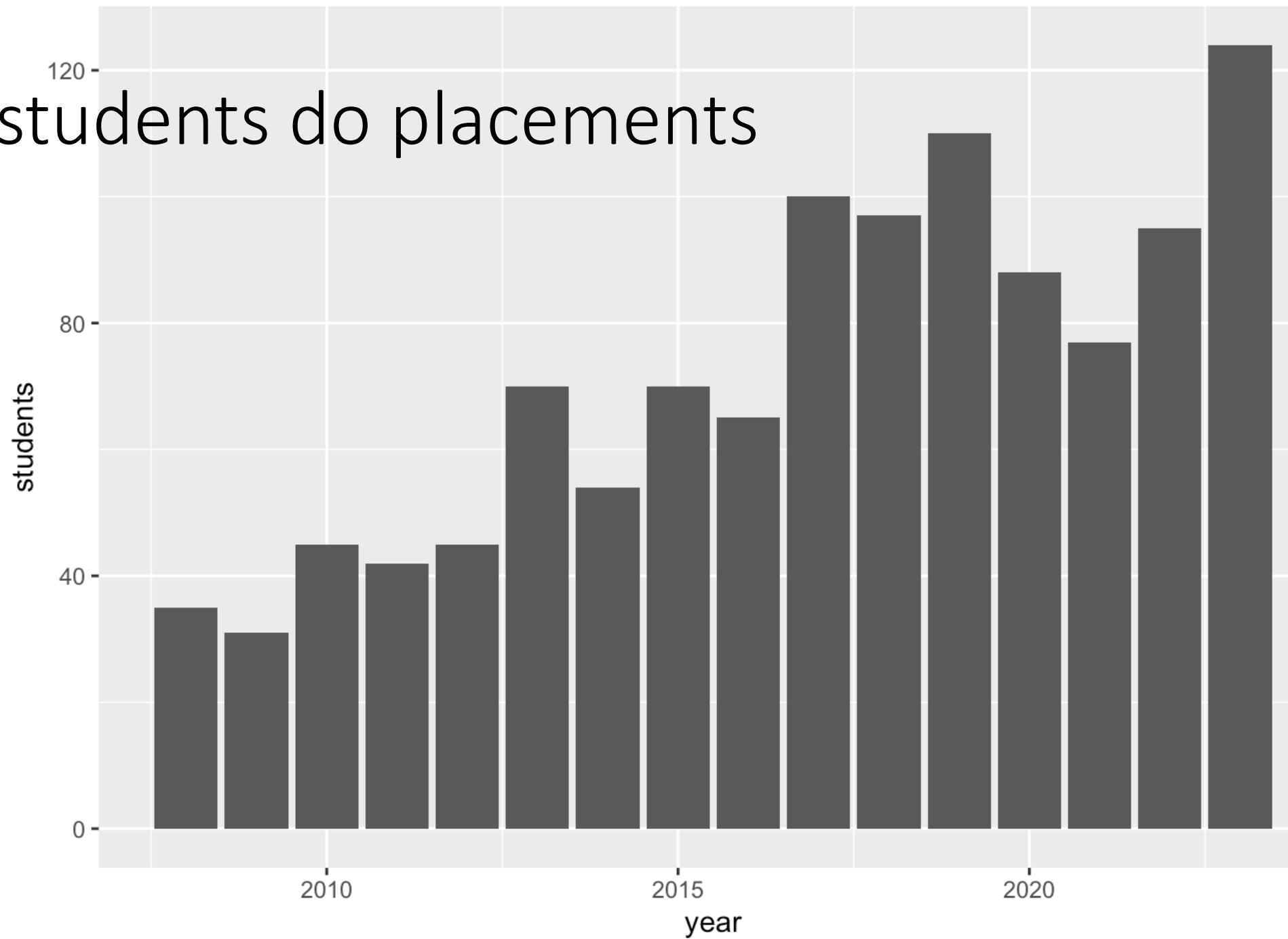
Table 4.6 Universities Targeted by Largest Number of Top Employers in 2022-2023

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

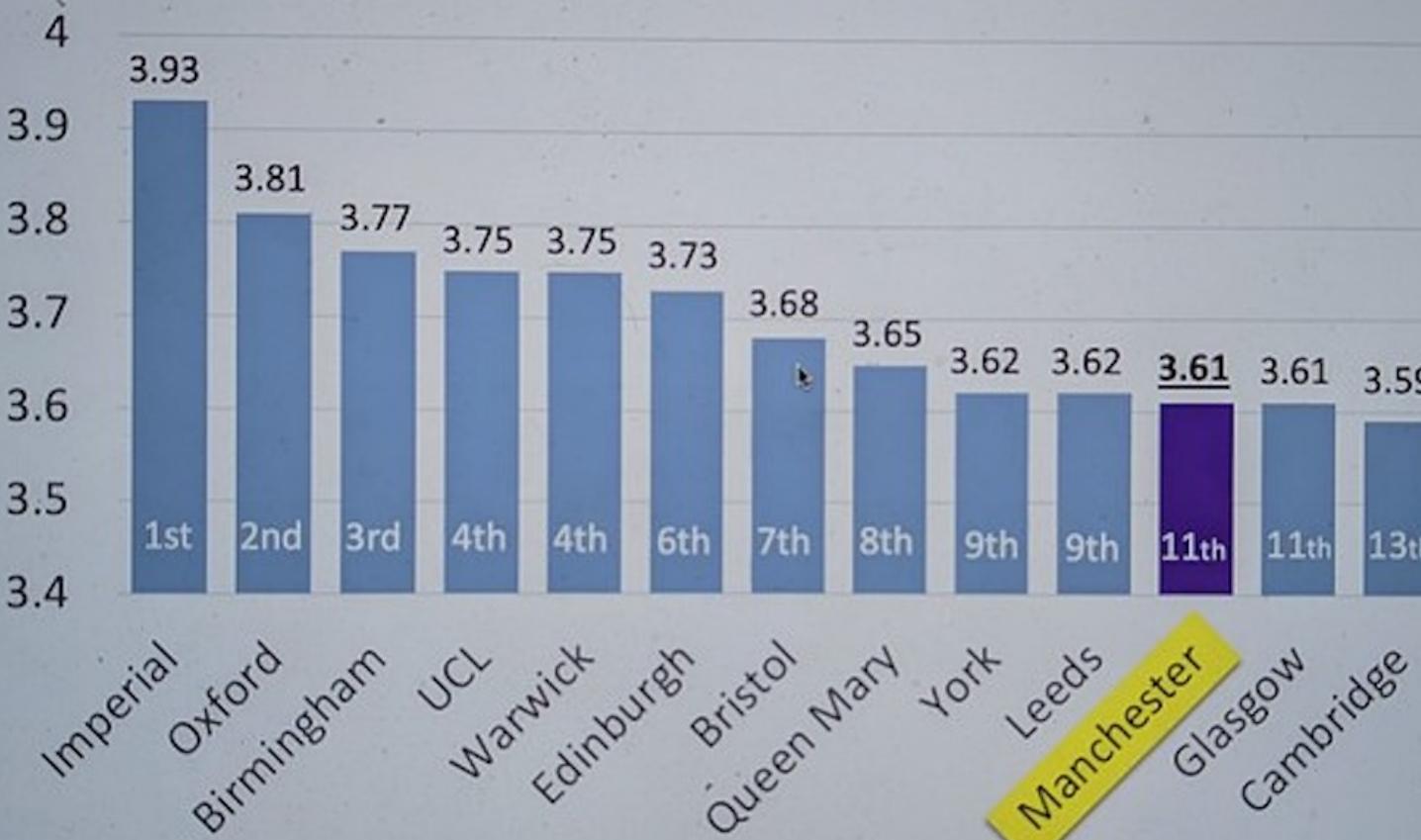
Hearing your Future podcast, case studies



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?

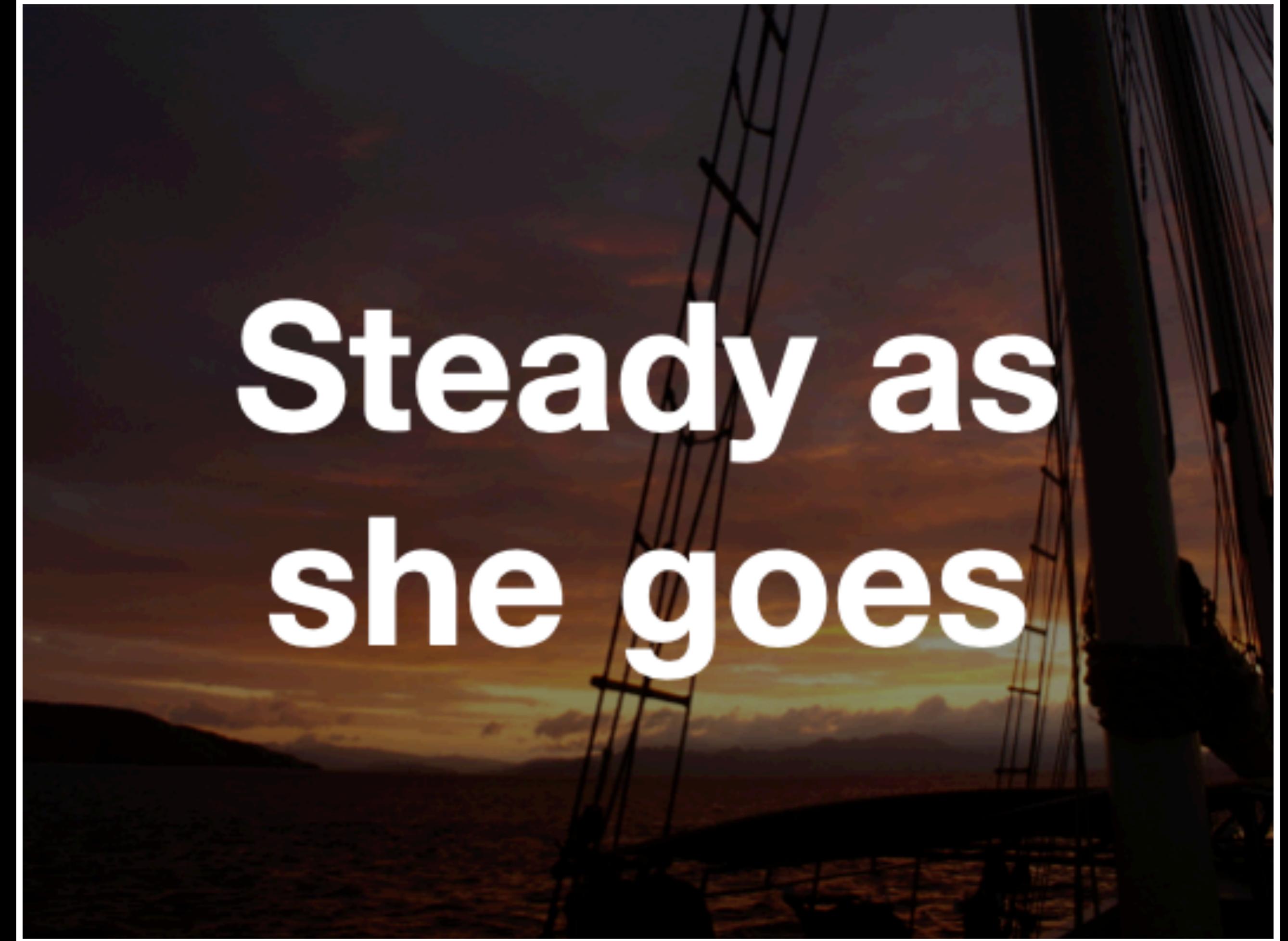
- Over to Sean and then Suzanne

CS Industry Club

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

In 2019...

**Steady as
she goes**



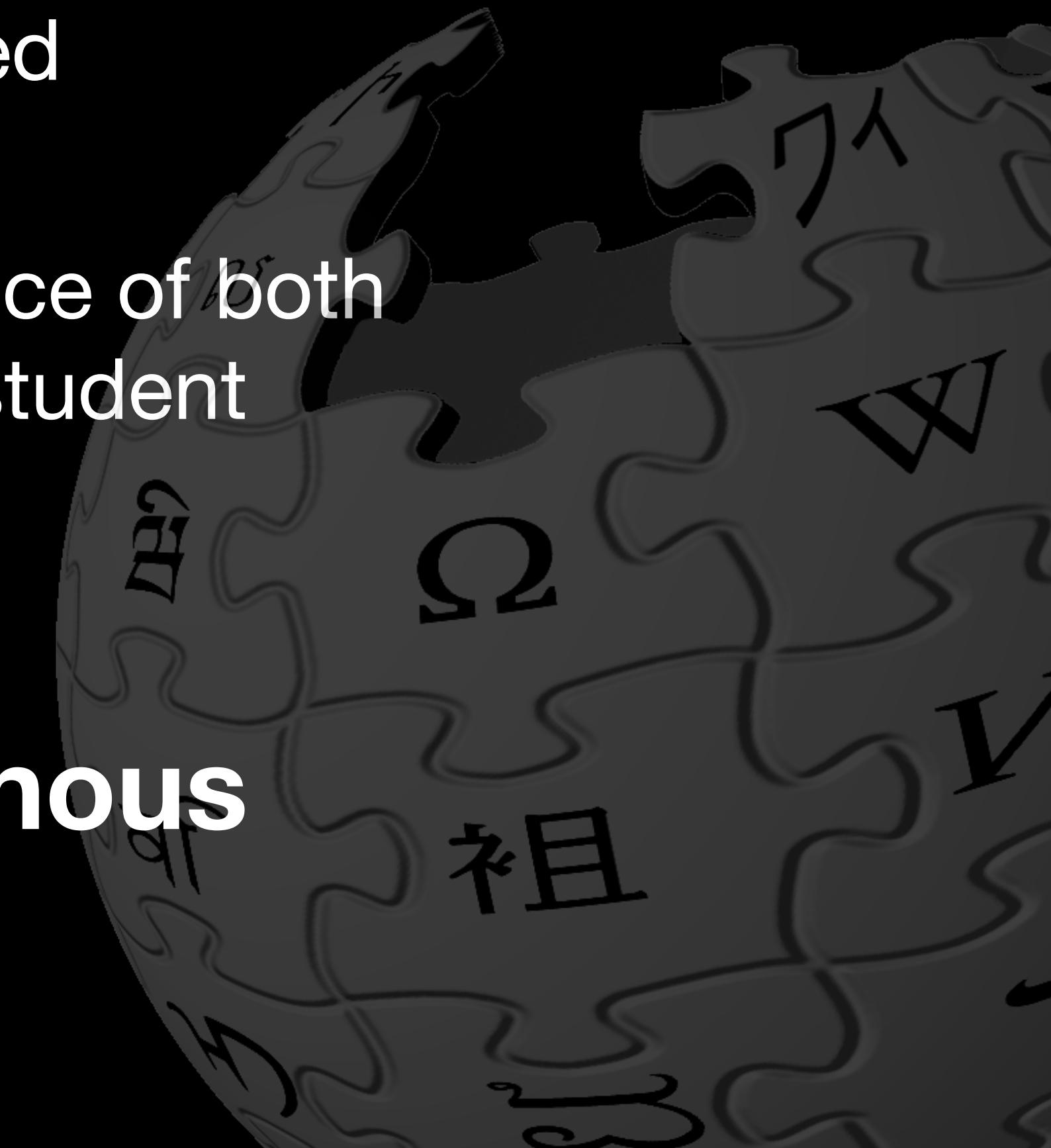


Blended Learning

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

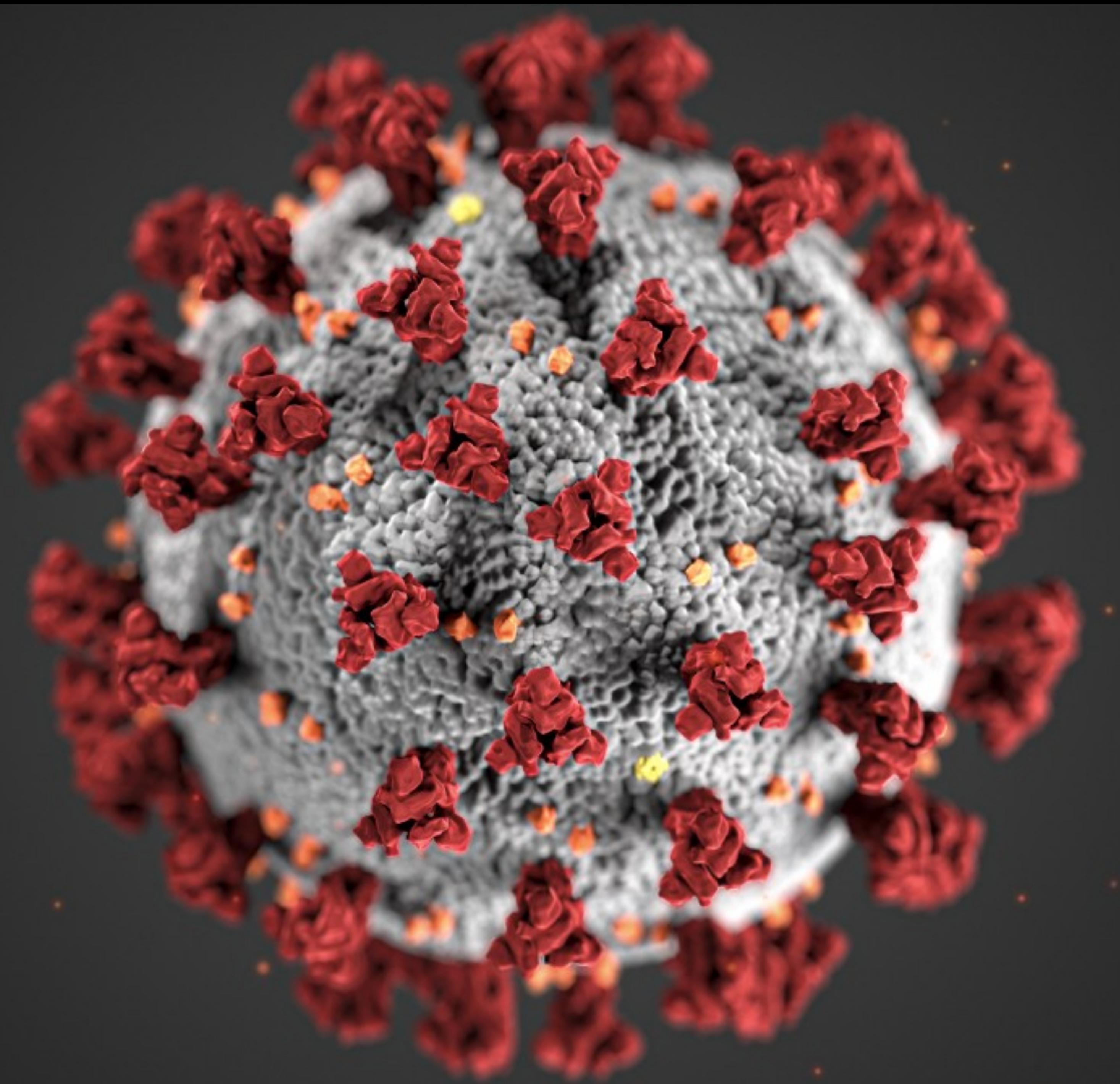
Tutorial

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

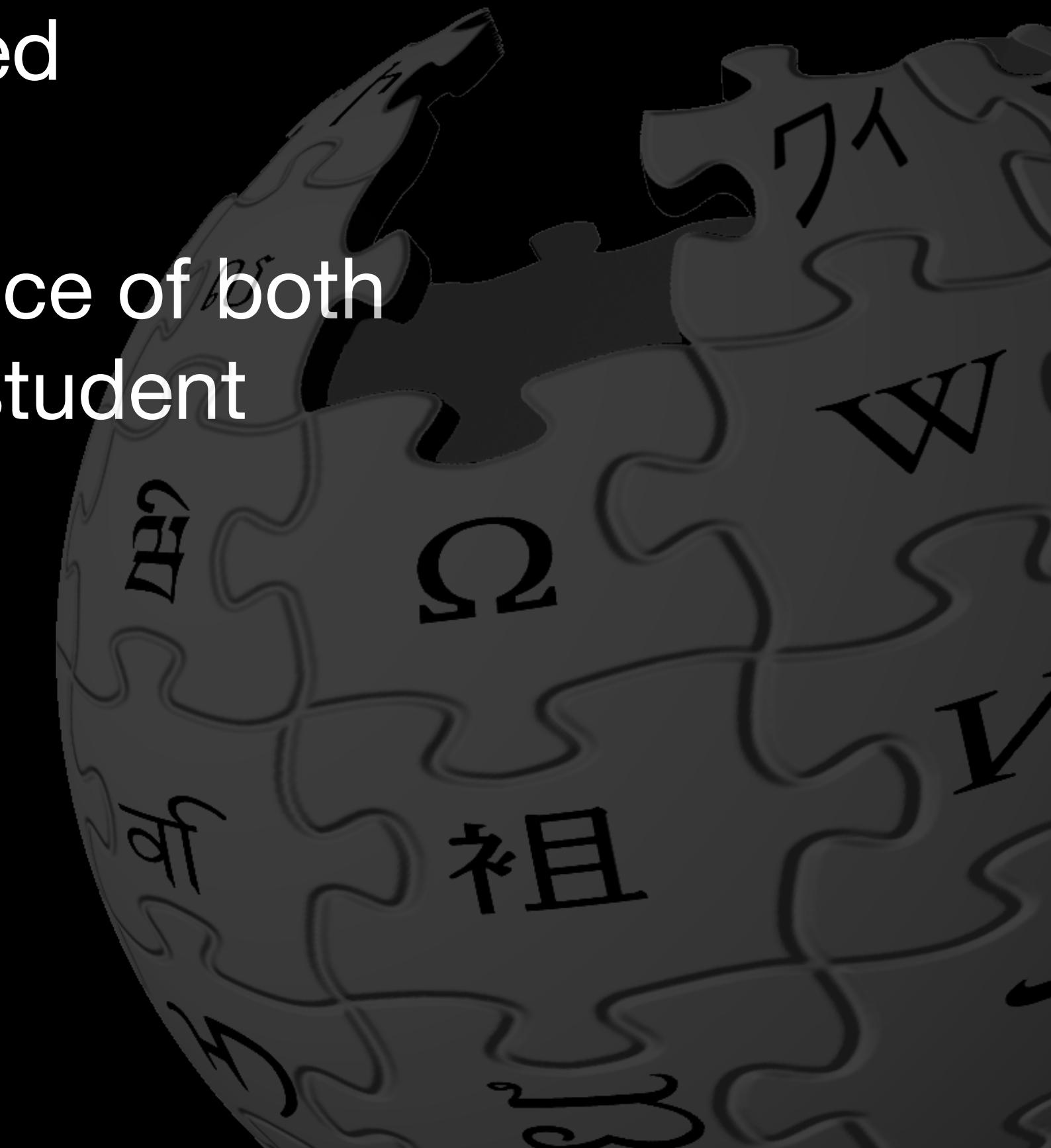
Semester 1 online
option (~20%)

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.

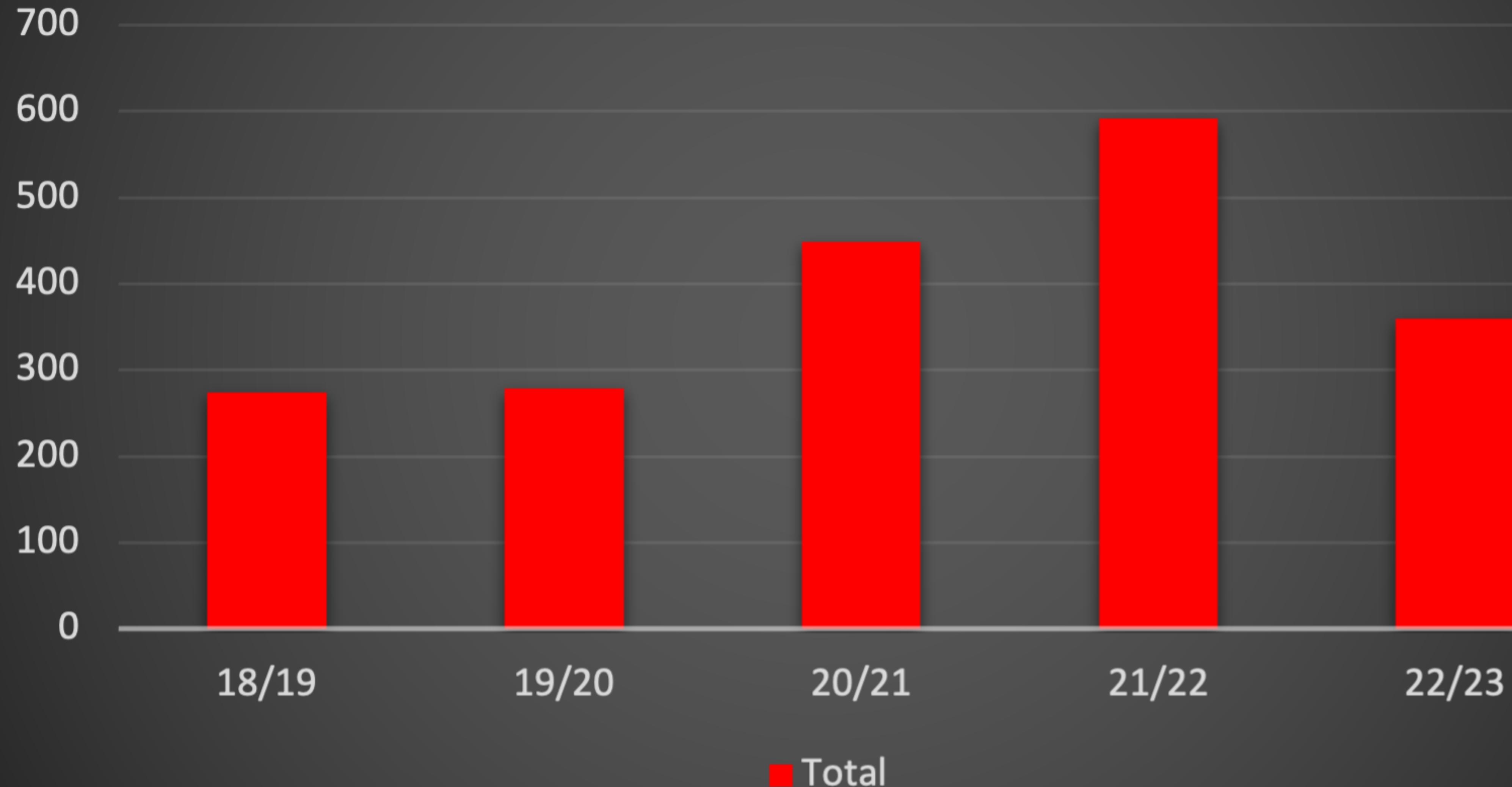
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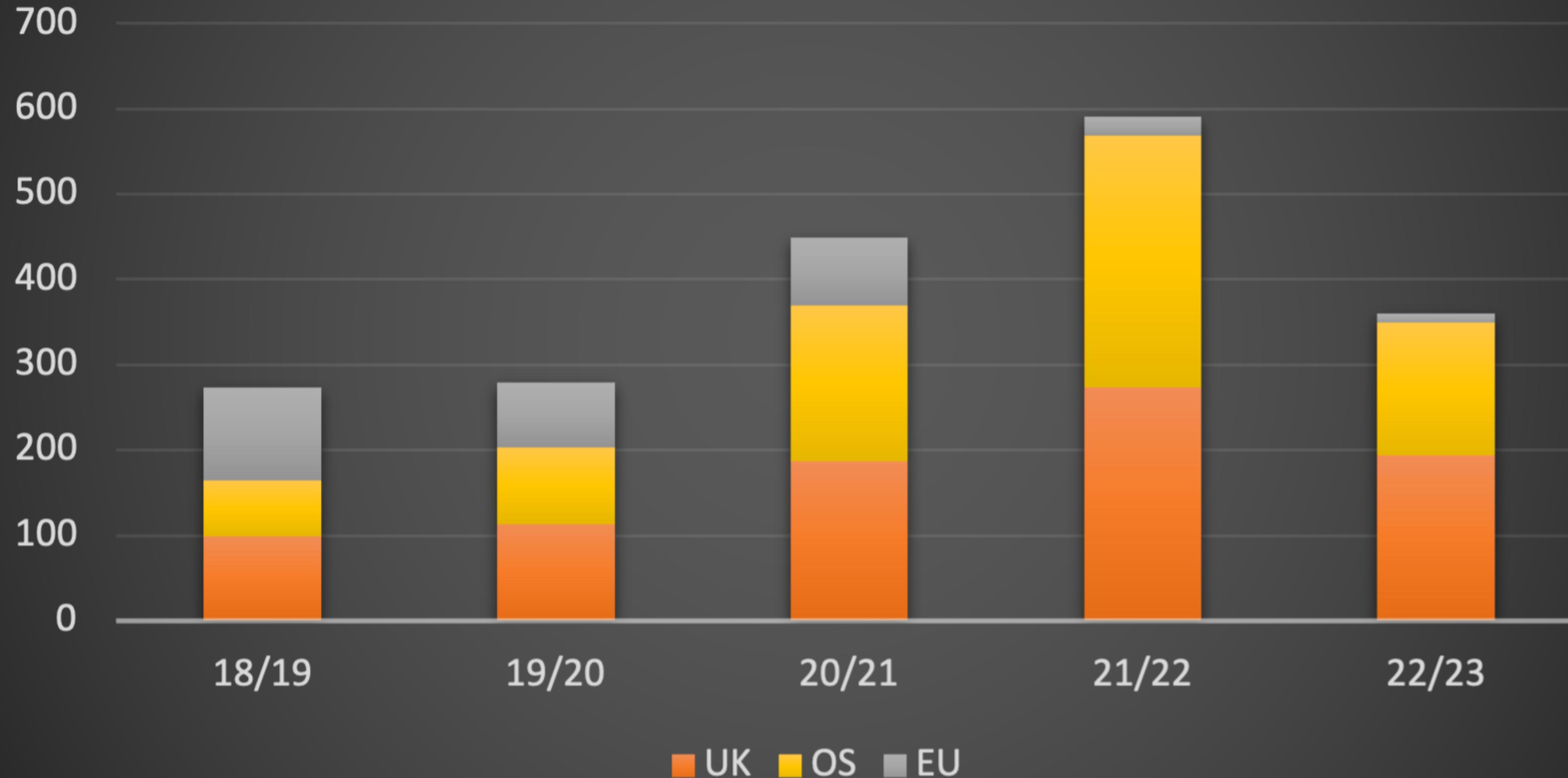
Cohorts



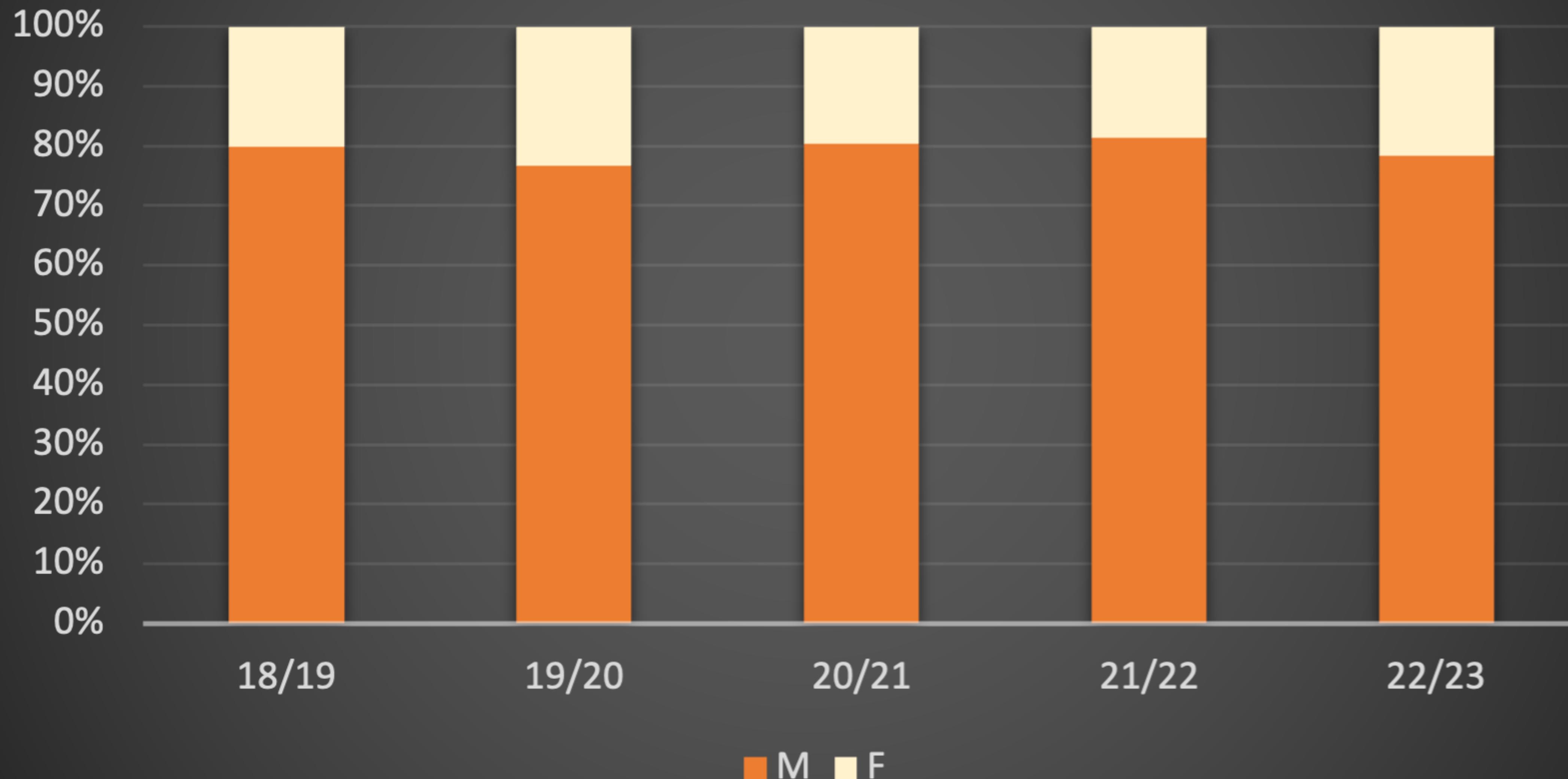
Y1 Intake



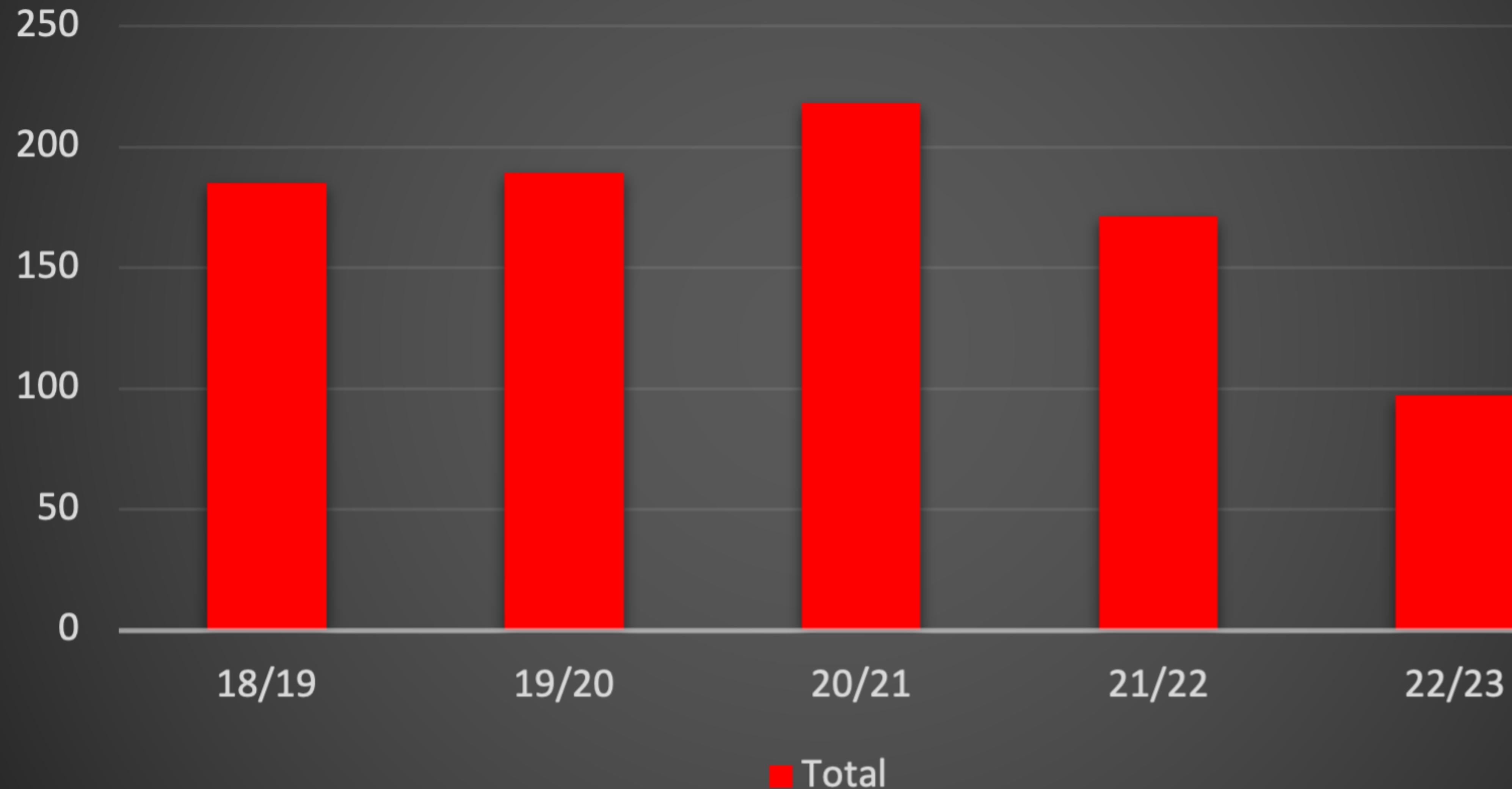
Y1 Domicile



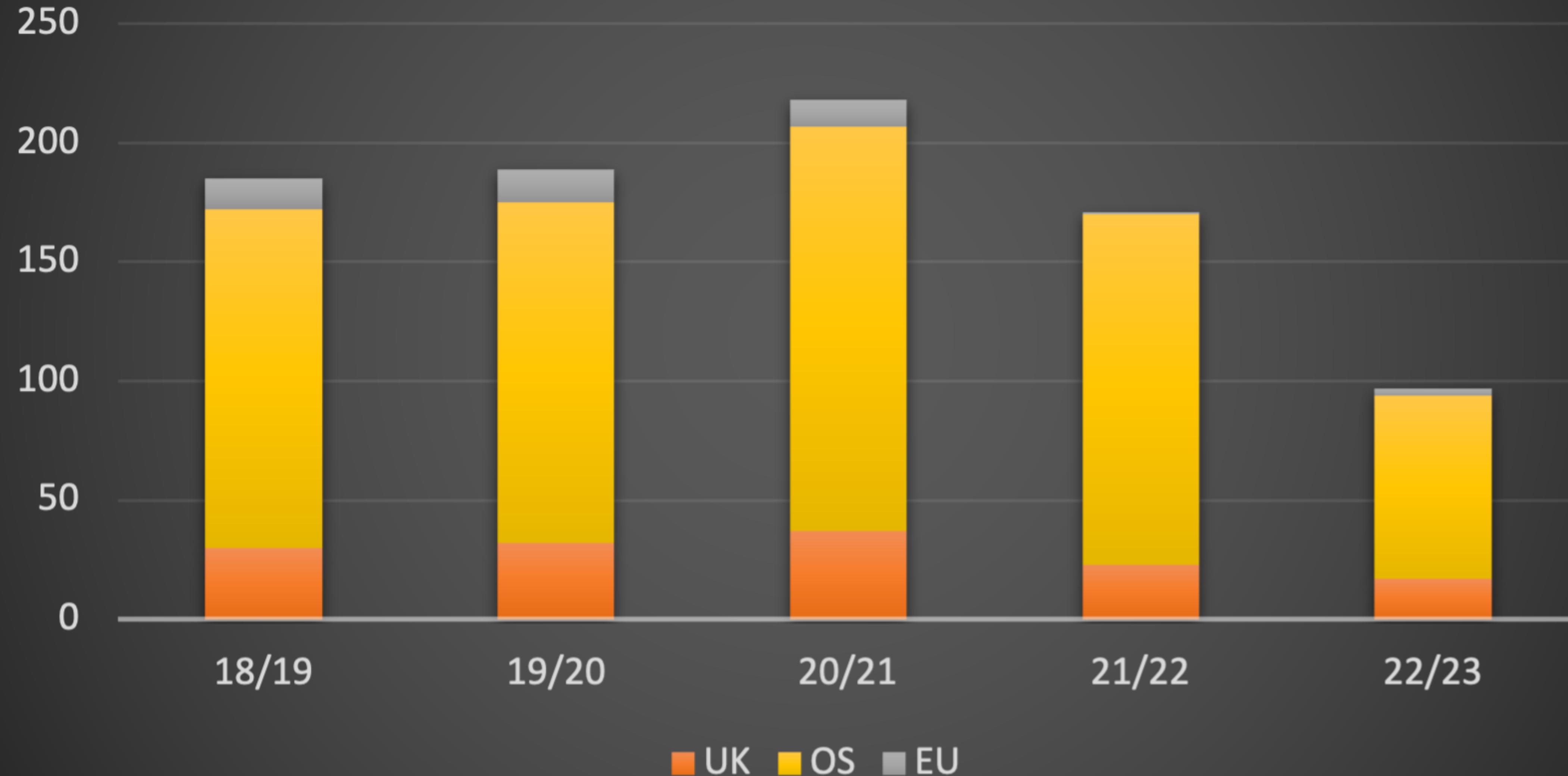
Y1 Gender



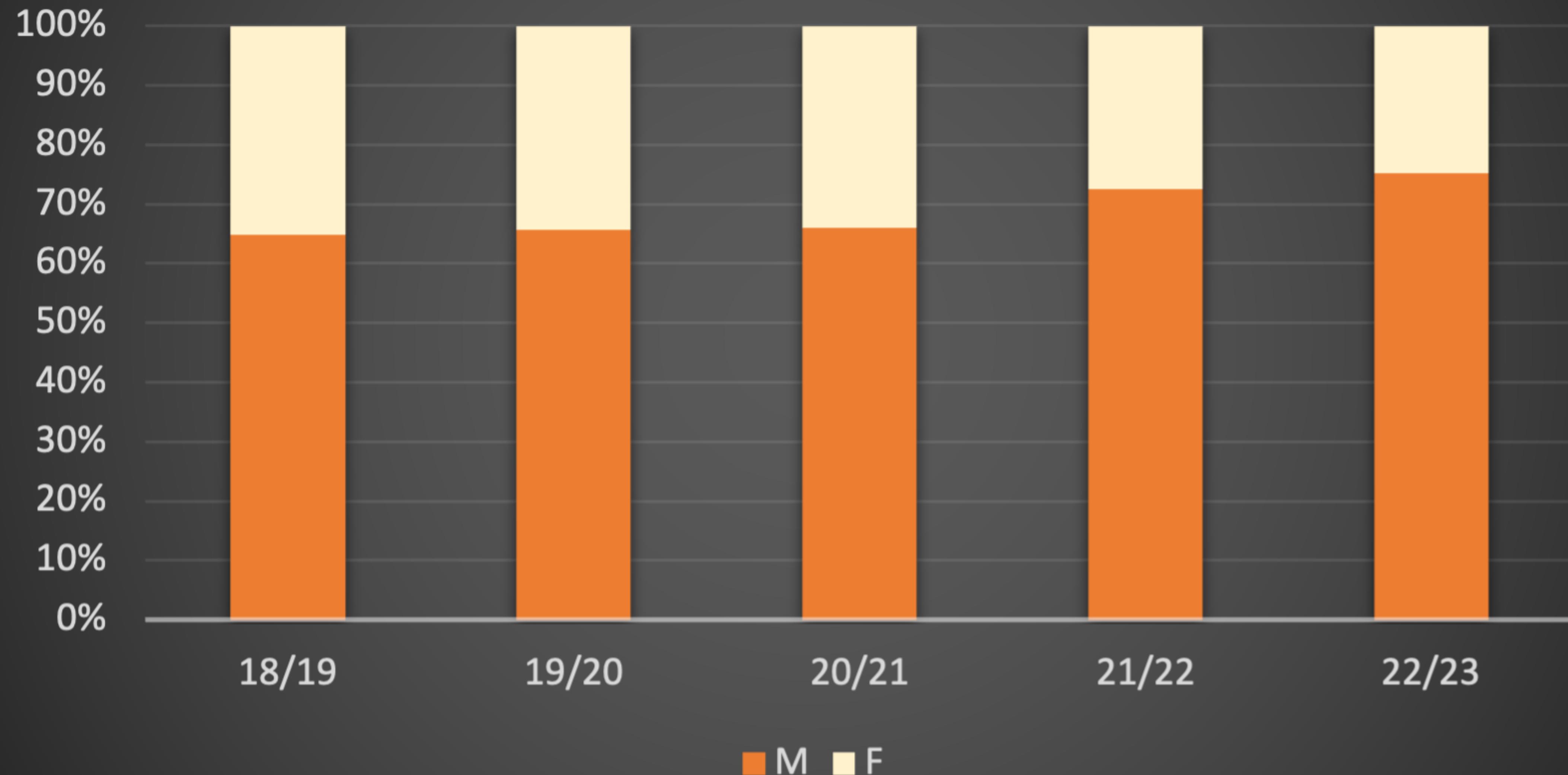
PGT Intake



PGT Domicile



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 for Computing
COMP11212	Fundamentals of Computer Systems
COMP12111	Fundamentals of Computer Networks
COMP15111	Fundamentals of Computer Programming
COMP13212	Data Science
COMP15212	Operating Systems
COMP16321	Introduction to Programming Languages
COMP16412	Introduction to Programming Languages

Y1: 19

Y2: 20

Y3: 21

Level 2 - compulsory units

All of the units in this pool are mandatory.

Code	Title
COMP23311	Software Engineering
COMP23412	Software Engineering
COMP26120	Algorithms and Data Structures
COMP26020	Programming Languages

Level 2 - option pool 1

From this option pool choose a maximum of 30 credits and a minimum of 15 credits.

Code	Title
COMP21111	Logic and Modelling
COMP22111	Processor Microarchitectures
COMP23111	Database Systems
COMP24011	Introduction to Computer Vision

Level 2 - option pool 2

From this option pool choose a maximum of 30 credits and a minimum of 15 credits.

Code	Title
COMP22712	Microcontrollers
COMP24112	Machine Learning
COMP24412	Knowledge-based Systems
COMP25212	System Architecture
COMP27112	Introduction to Virtual Reality
COMP28112	Distributed Systems

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

Sd

Computer Science [+ wIE]

Cc

Computer Science and Maths [+ wIE]

C

Computer Science (HUC)

MEng

UG Programme Changes

Artificial Intelligence

Sch

Unaccredited exit awards

Co

BSc (Hons) Computing - Computer Science

Computer Science (HUC)

MEng

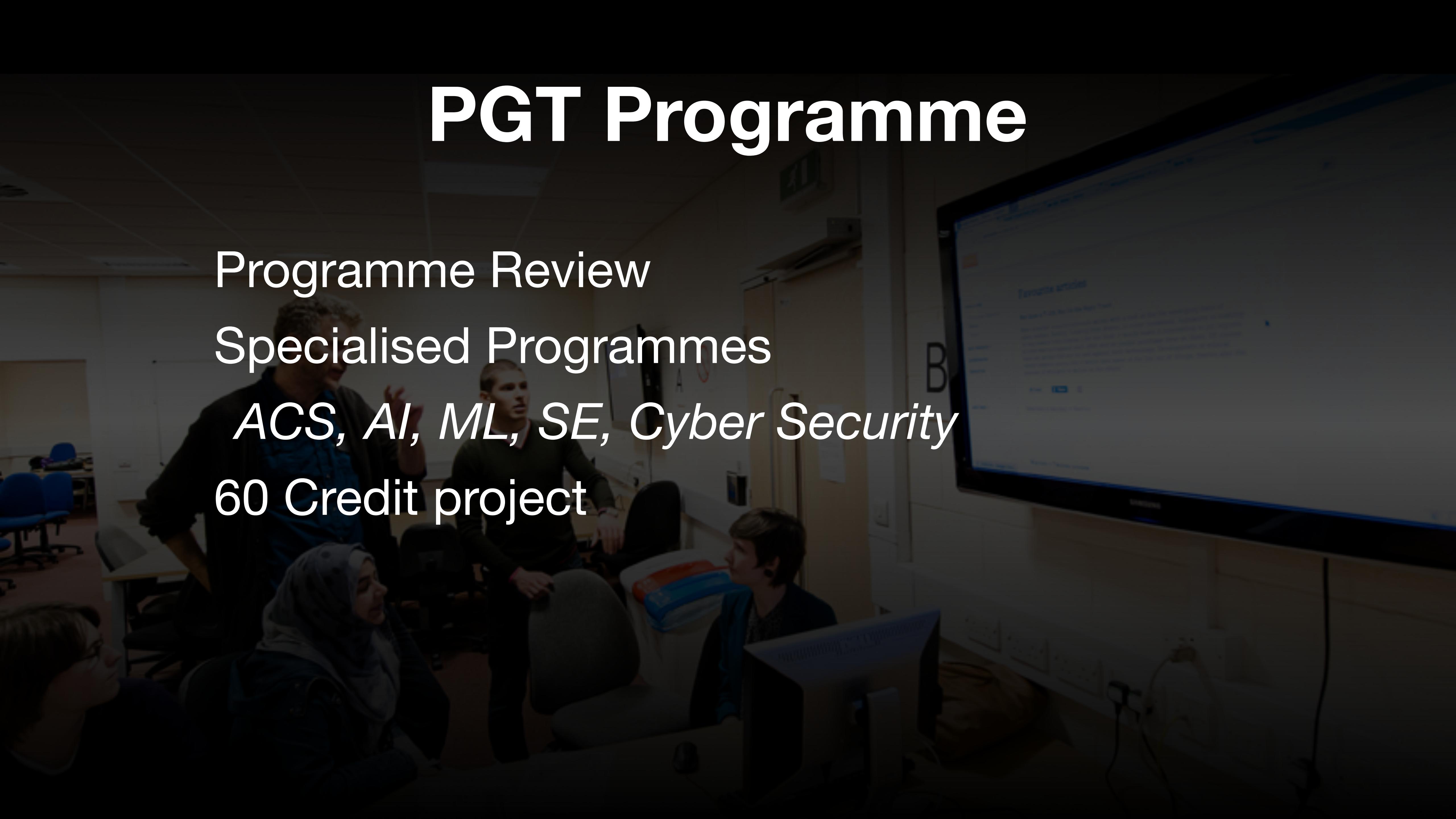
PGT Programme

Programme Review

Specialised Programmes

ACS, AI, ML, SE, Cyber Security

60 Credit project





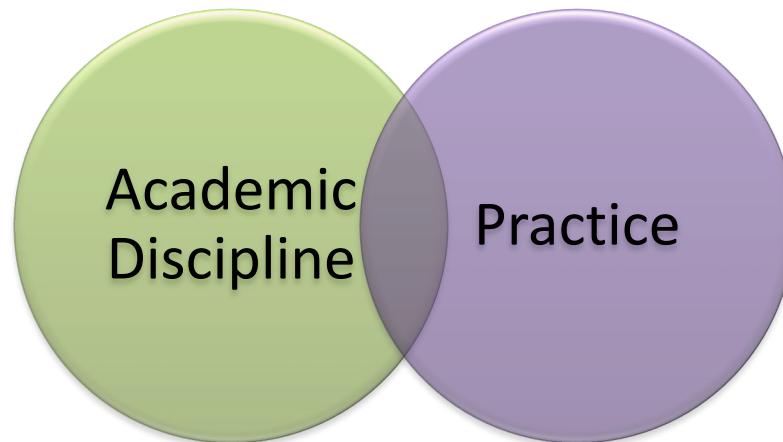
Imago: the UoM Student Software Company

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)



The University of Manchester

A57(M)

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

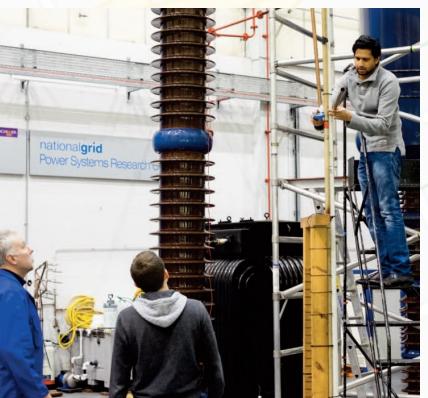


MANCHESTER

1824

The University of Manchester

A57(M)

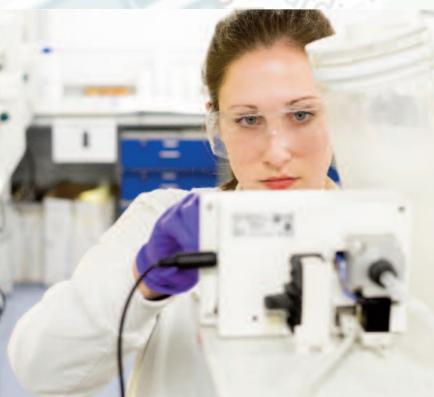


MANCHESTER

1824

The University of Manchester

A57(M)



MANCHESTER 1824

The University of Manchester

A57(M)



Imag^o
Software



How does it work?



Academic/
Researcher



Imago Academic



Imago Industry
Partner

How does it work?



Academic/
Researcher



Imago
Student
Team

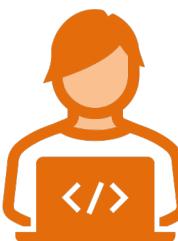
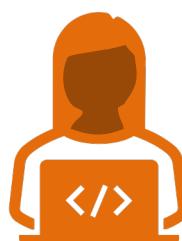
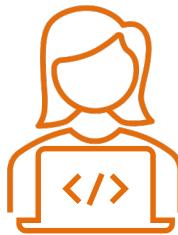


Academic Coach



Industry Mentor

What do clients pay for?



Imago
Student
Team's
Salary



Academic Coach's
Time



Contribution to
Equipment Costs



Contribution to
Cloud-Based
Dev Environment



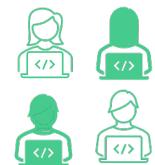
University
Overheads
(external projects
only)

The Imago Year

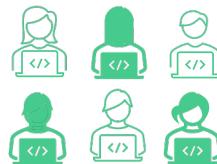
Workshops



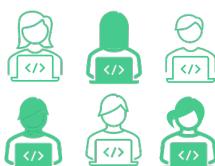
Social Events



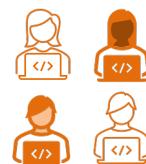
Networking



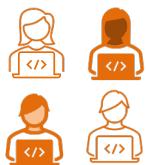
Advisory
Board Office
Hours



Blogs/Videos



Training



Pitches &
presentations

Autumn Semester

Xmas Vacation
+ January
Exams

Spring
Semester +
Easter vacation

May/June
Exams

Summer
Vacation

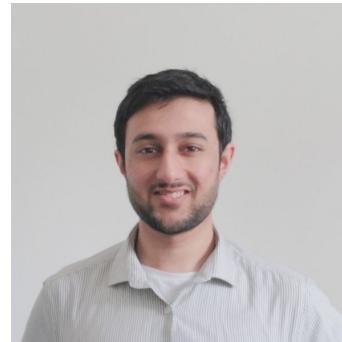
Supergen Bioenergy Hub

Jang
Belche (Y1)



Business
Analyst

Karam
Agha (Y2)



Quality
Engineer

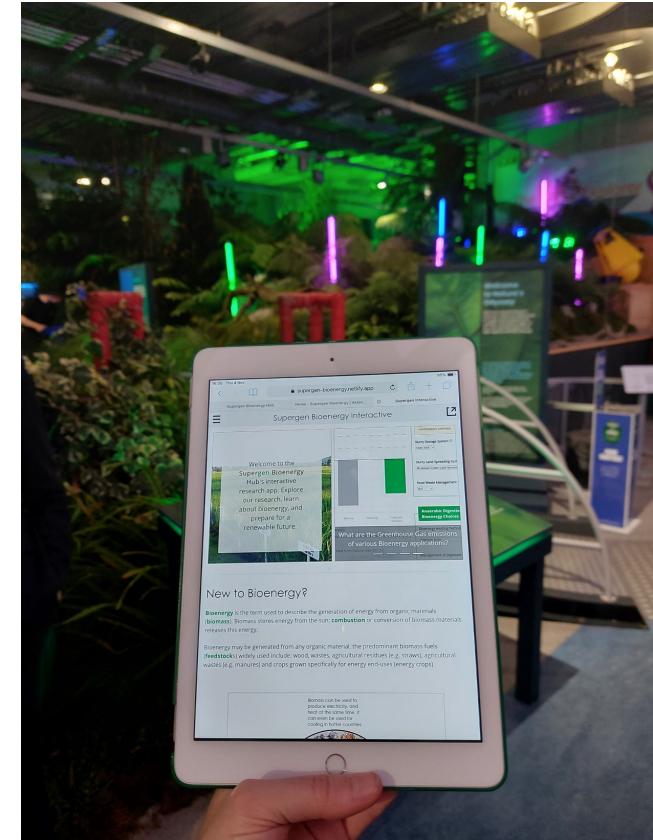


UX
Engineer



Miranda
Watkins (Y1)

Amish
Shah (Y1)



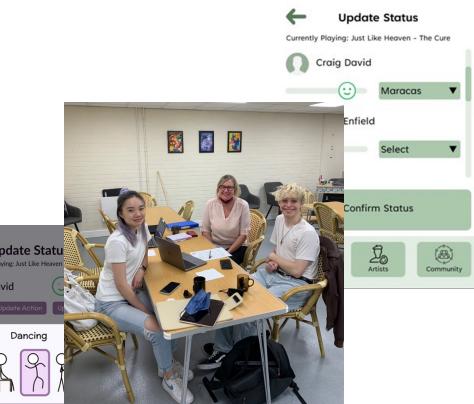
App used at COP26
supergen-bioenergy.netlify.app/



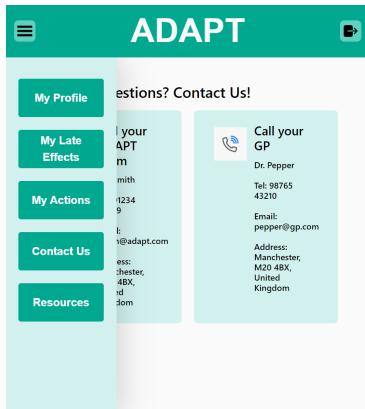
Open Source
Software
Workshops



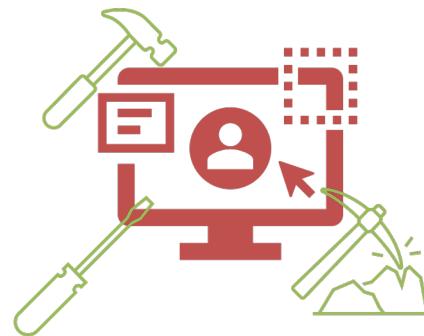
5 Day Design Sprints



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/>

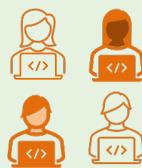
▶ <https://www.youtube.com/channel/UCfLyZawx2rSy21hph8hOlmg>

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).



Project Models



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



Autumn Semester

Xmas Vacation
+ January
Exams

Spring
Semester +
Easter vacation

May/June
Exams

Summer
Vacation

Project Models



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



Autumn Semester

Xmas Vacation
+ January
Exams

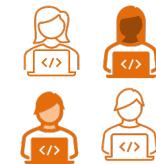
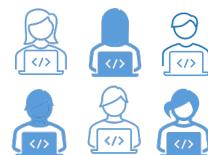
Spring
Semester +
Easter vacation

May/June
Exams

Summer
Vacation

Project Models

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



Autumn Semester

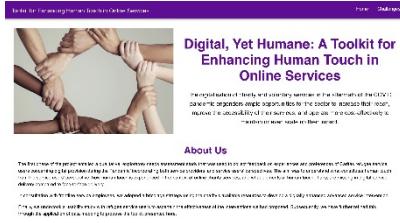
Xmas Vacation
+ January
Exams

Spring
Semester +
Easter vacation

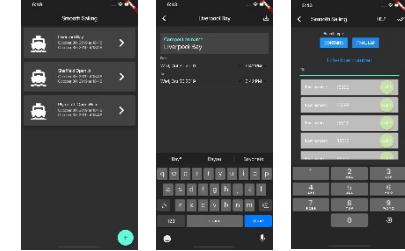
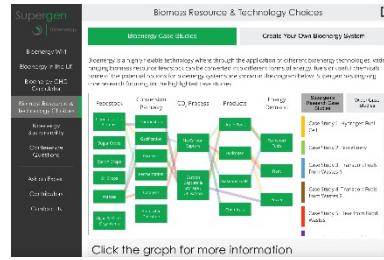
May/June
Exams

Summer
Vacation

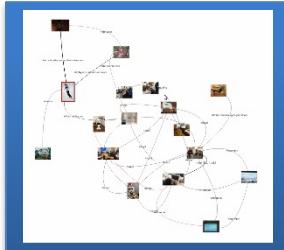
Our Portfolio



**Supergen
Bioenergy
Hub / MACE**



Caritas/AMBS



Cohere / Manchester
Institute for Education



Flexible Learning Course Manager

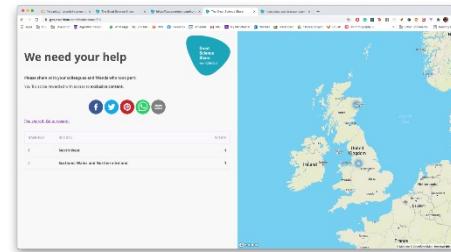
Covid Contact Tracer / AMBS



Ancient Egypt Game / Manchester Museum



Smooth Sailing App



Feedback Tool / SEERIH

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





software-eng.netlify.app/mentoring

Software engineering mentoring at the University of Manchester

Share

Are you a software engineer?

- Would you like to be a software engineering mentor at the University of Manchester?

MANCHESTER
1824

The University of Manchester

Watch on YouTube

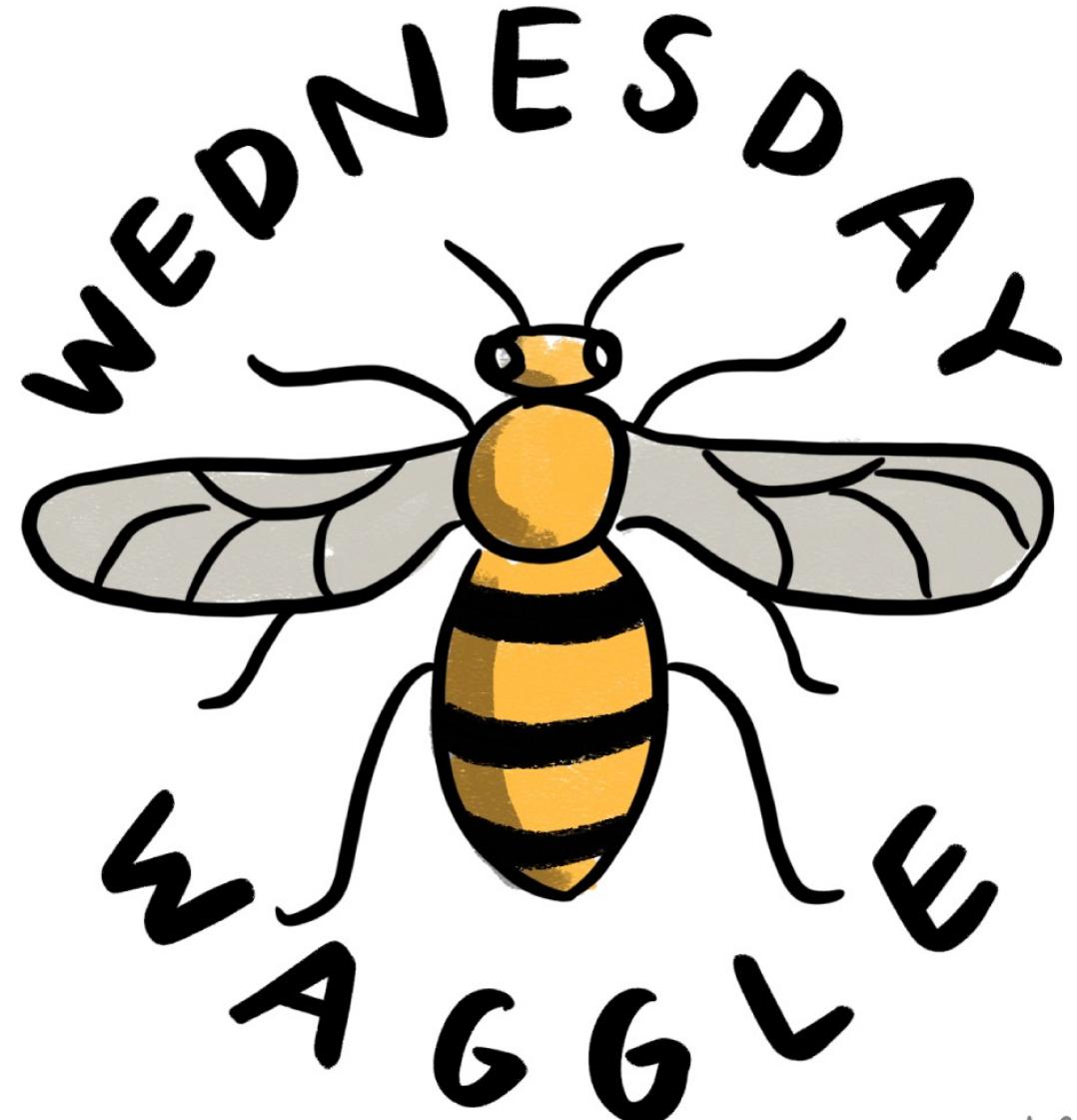
Student Societies: UNICS unicsmcr.com

- 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



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.

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



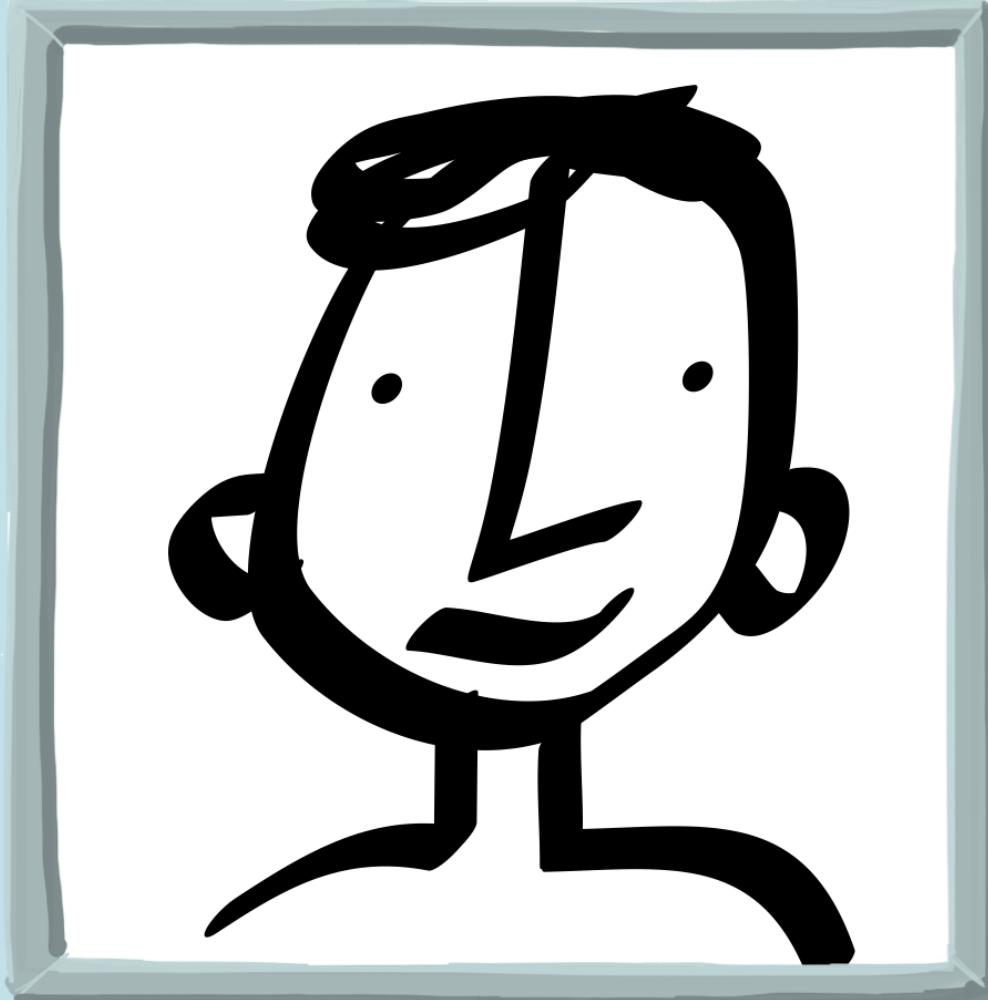
A CERTIFICATE
IS JUST AN
OFFLINE BADGE...

THOUGHT: DOUG BELSHAW

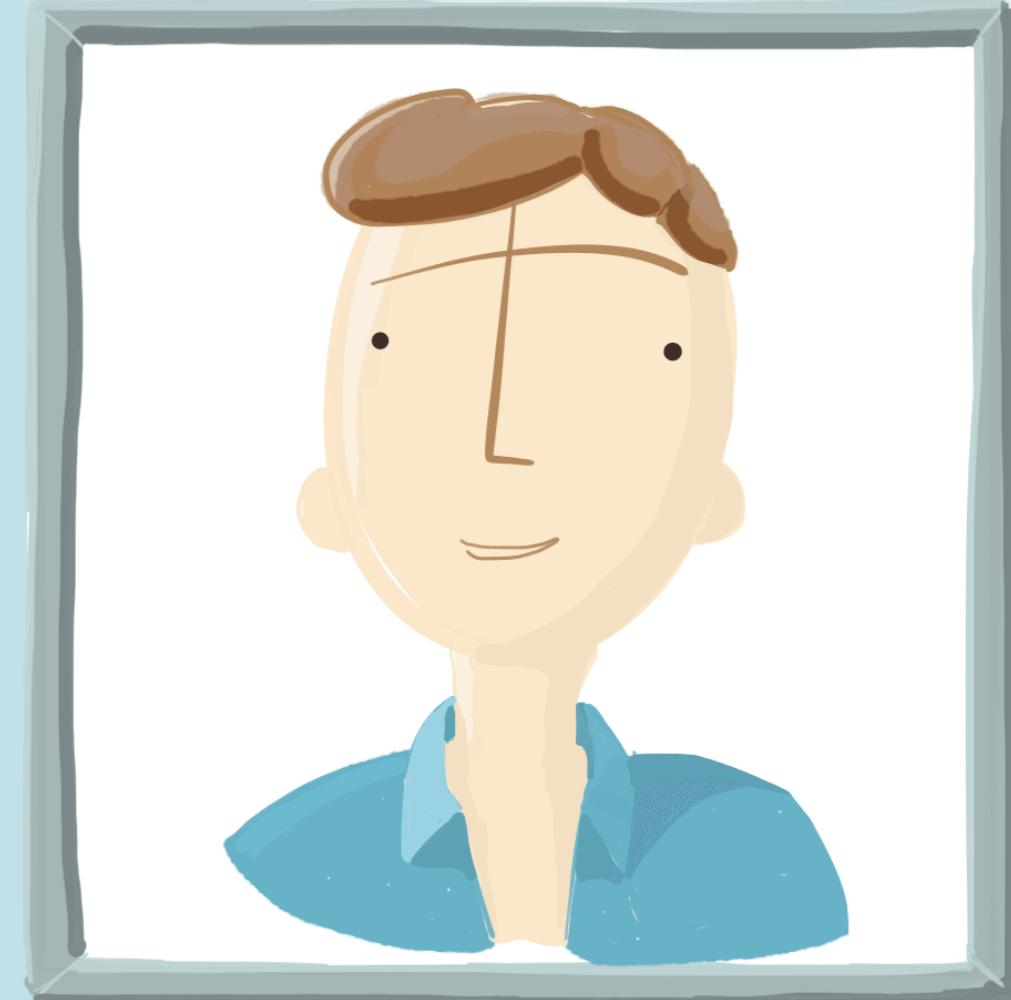


@bryanMatters

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

UK-based micro-credentials models

Digital passport/RPA

A) Independent



B) Entry

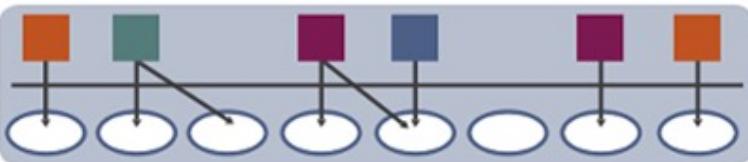


Tariff bearing
credentials

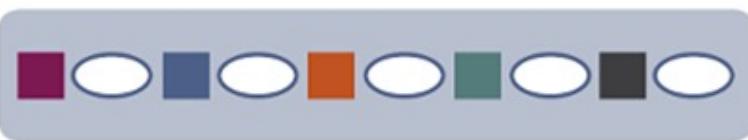
C) Accreditation of prior learning



D) Embedded (non-credit)



E) Embedded stacking (credit)



Level 3

Undergraduate qualification

Postgraduate/
masters qualification

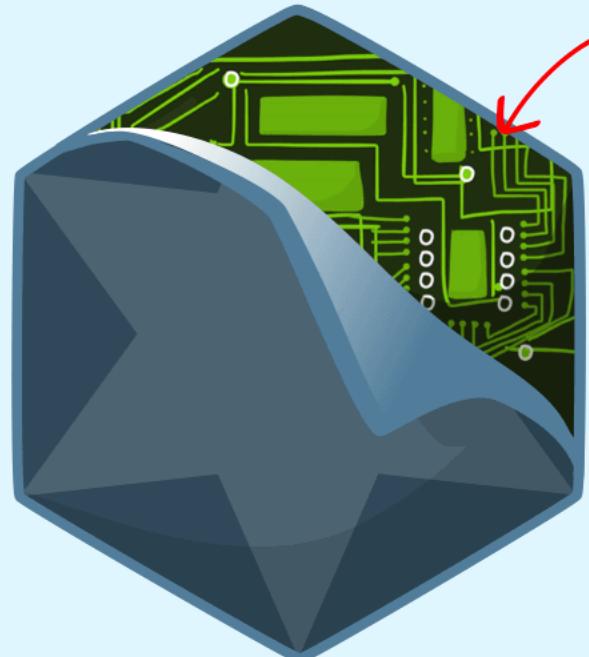
■ Alternative/
Micro-credentials

○ HE Modules

Image via Sue Reece doi.org/kk46

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

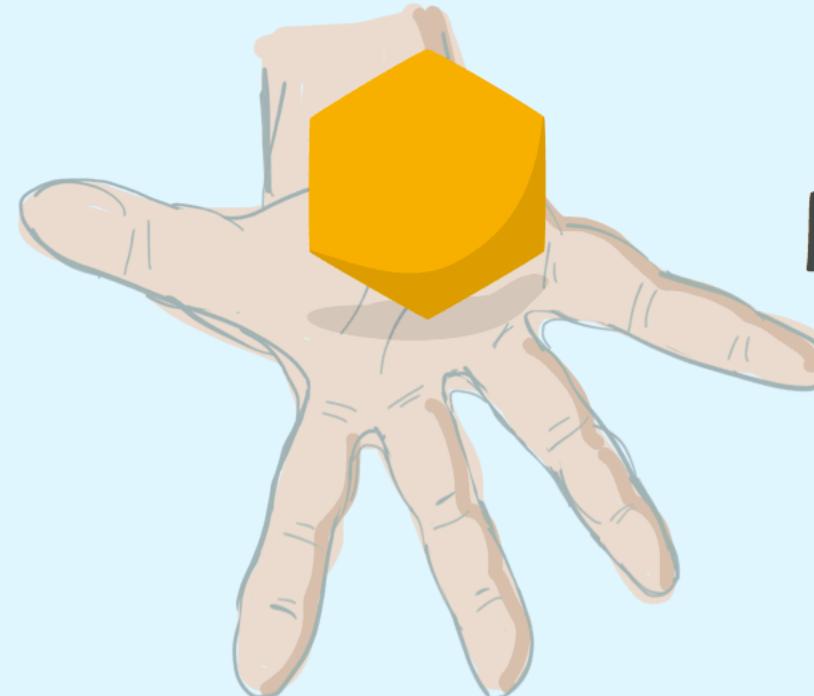


THERE'S
DATA INSIDE!

Evidence
based



Stackable



Free &
Open

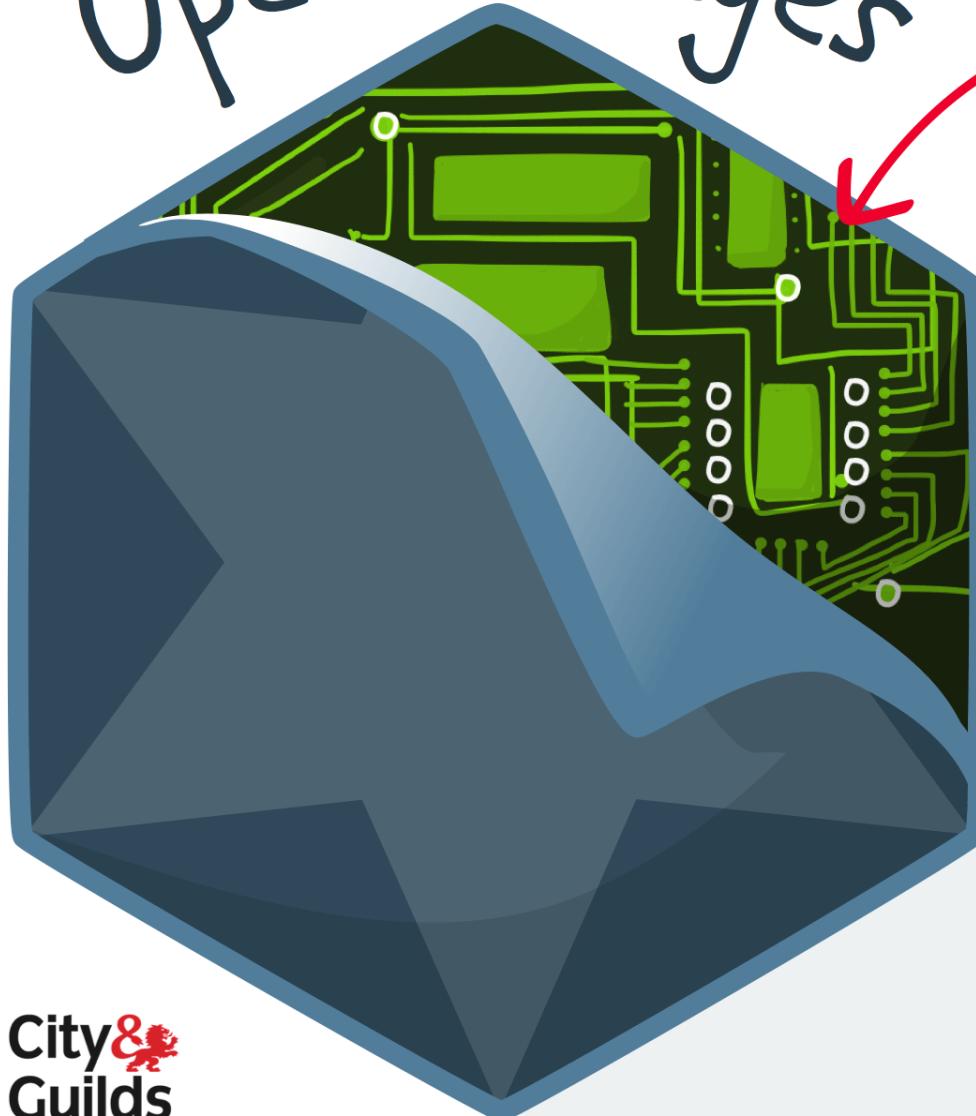
Transferable



Job

College

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



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?

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