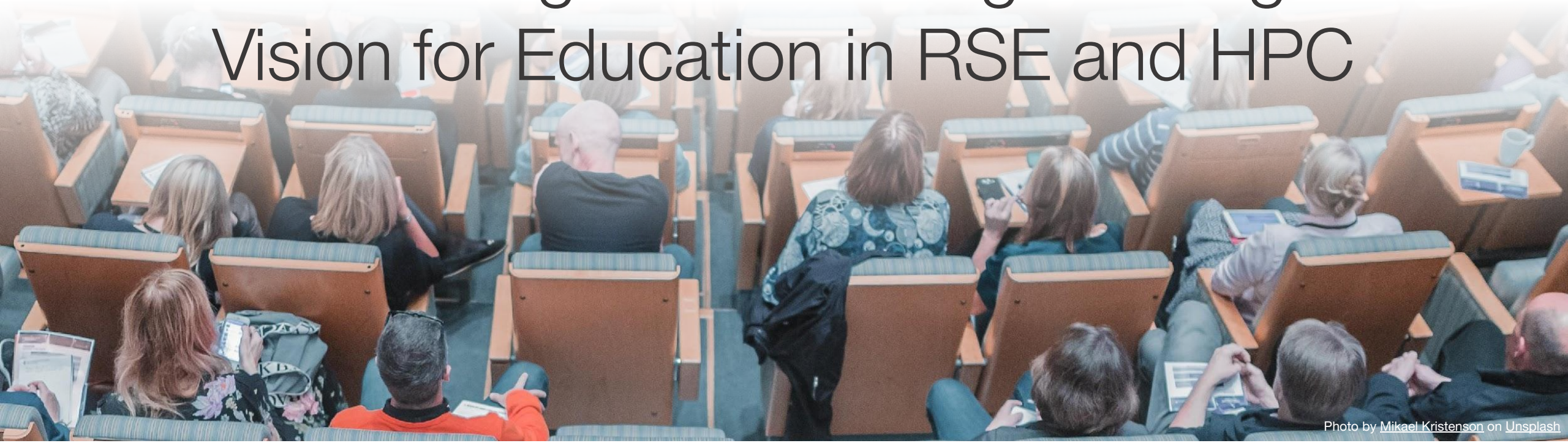
UNIVERSE HPC

Website: https://www.universe-hpc.ac.uk
Repository: https://github.com/UNIVERSE-HPC

UNIVERSE-HPC:

Understanding and Nurturing an Integrated Vision for Education in RSE and HPC



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Modules, Courses, Pathways

Work with partner universities (Edinburgh, Oxford, Southampton, Imperial), BCS, Society for RSE and community to define the most useful pathways for training RSEs

Go beyond “traditional backgrounds” e.g physical and computer sciences to improve diversity of those entering the profession

Identify different options for training RSEs specialising in High Performance Computing (in the broadest sense)

	Modules	Current Status	ExCALIBUR RSE KI Landscape Skills
Core RSE skills	Scientific Computing for RSEs	Already developed by Oxford	CS4, PS11, SCS1
	Data Science and Data Management for RSEs	Adapted from material by Oxford and Edinburgh	PS9, AI1, ADW1-10
	Programming Skills	Already developed by Edinburgh	SCS1-3
	Software Development Practices	Already developed by Edinburgh	SCS4-5, DPPO3, PS10
	Software Architecture and Design	Adapted from material by Oxford and Southampton	SCS2-5
Core HPC skills	Introduction to HPC	Already developed by Edinburgh	CS1-3, ADW1-2,4
	Message Passing Programming	Already developed by Edinburgh	PS3-5
	Threaded Programming	Already developed by Edinburgh	PS6-7
Specialist RSE skills	Image analysis for RSEs	Already developed by Oxford	ADW7-10
	Bayesian inference for RSEs	Already developed by Oxford	CS4, AI1
	Stewarding an Open Software Community	Adapted from material by Oxford and Southampton	SCS3-5
	Containers for Reproducible Runtimes	Adapted from material by Edinburgh & Imperial	PS10-11, ADW11
	Creating and Supporting Cross-Platform Software	Adapted from material by Oxford and Southampton	PS6-7, SCS4-5
	Using and Creating Reusable Software Components	Adapted from material by Oxford and Southampton	SCS5
	Interactive Reproducible Programming with Notebooks	New material	PS11, SCS6 + new skills
	Sharing and Archiving Research Software / FAIR4RS	Adapted from material by Edinburgh	SCS1-6
	Managing Project Teams and Budgets	New material	SCS1-2 + new skills
	Responsible Research & Innovation	New material	SCS1 + new skills
Specialist HPC skills	HPC Architectures	Already developed by Edinburgh	CS3
	GPU Programming	Adapted from material by Edinburgh	PS7, AIML1-3
	Performance Programming, Analysis and Optimisation for HPC	Already developed by Edinburgh	CS8, DPPO1-5, ADW3
	Numerical Algorithms for High Performance Computing	Already developed by Edinburgh	CS4
	Design and Analysis of Parallel Algorithms	Already developed by Edinburgh	CS4, DPPO1-5
	Advanced Parallel Techniques	Already developed by Edinburgh	PS1-2, 6-7
	Parallel Design Patterns	Already developed by Edinburgh	CS2, PS9, ADW1-6

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Competencies and Skills	Learning Pathways	Course Development + Delivery	Community Support + Contributions
Identify the competencies and skills required by RSEs as they progress through their careers. Understand where these competencies are already being taught.	Define different curriculum, learning pathways, and delivery mechanisms for providing training in RSE competencies, including as taught programmes, online/self-paced learning and professional development.	Development of missing modules. Packaging of existing and new modules into different formats. Pilot delivery of courses.	Facilitate professional networking and peer support for RSEs. Develop a community of maintainers for open materials.

Equity, Diversity and Inclusion

Slide content: Neil Chue Hong

UNIVERSE-HPC: Year 1

- Survey of training needs at RSECon22
  - Suitable training lacking in Project Management, Grant Writing, Collaboration and Teamwork
  - Machine Learning, Profiling/Optimisation, Energy Management, Packaging seen as essential skills to learn next
- ByteSized RSE webinars and podcasts
  - First season of 8 sessions, planning for second season to have more external contributors
- Case studies
  - One published, more in preparation
- Courses
  - Course material being developed - first pilot ran last month
- International collaboration
  - CodeRefinery, Intersect (US), deRSE