

UNIVERSE-HPC: Understanding and Nurturing an Integrated Vision for Education in RSE and HPC

Kirsty Pringle

Neil Chue Hong, Weronika Filinger, Martin Robinson,
Steve Crouch, Jeremy Cohen, Eirini Zormpa

Competencies and Skills

Identify the competencies and skills required by RSEs as they progress through their careers. Understand where these competencies are already being taught.

Learning Pathways

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.

Course Development + Delivery

Development of missing modules. Packaging of existing and new modules into different formats. Pilot delivery of courses.

Community Support + Contributions

Facilitate professional networking and peer support for RSEs. Develop a community of maintainers for open materials.

Equity, Diversity and Inclusion

Career Paths and Personas

Level	Novice	Junior	Mid	Senior	Established
Technical Specialist	Apprentice, Intern	Junior RSE	RSE. Model Domain Expert, <i>PDRA</i>	Senior RSE, Technical Lead	Principal RSE, Principal Architect
Project Management		RSE Project Administrator	RSE Project Officer, Research Facilitator	RSE Project Manager, Senior Research Facilitator	Head of RSE
Knowledge Management	Helper, Demonstrator	Junior Trainer, Community Administrator	Trainer, Community Manager	Senior Trainer, Training Lead, Senior Community Manager	Head of Training, Head of Community
Academic equivalent (UK)	Undergraduate / Taught Masters	PhD student / Research Assistant / Fixed term Post Doc	Senior PDRA, Lecturer, Research Fellow	Senior Lecturer, Senior Research Fellow	Professor, Director of Research

“Technical Specialist” RSEs: who focus on developing research software or providing technical advice to those developing research software.

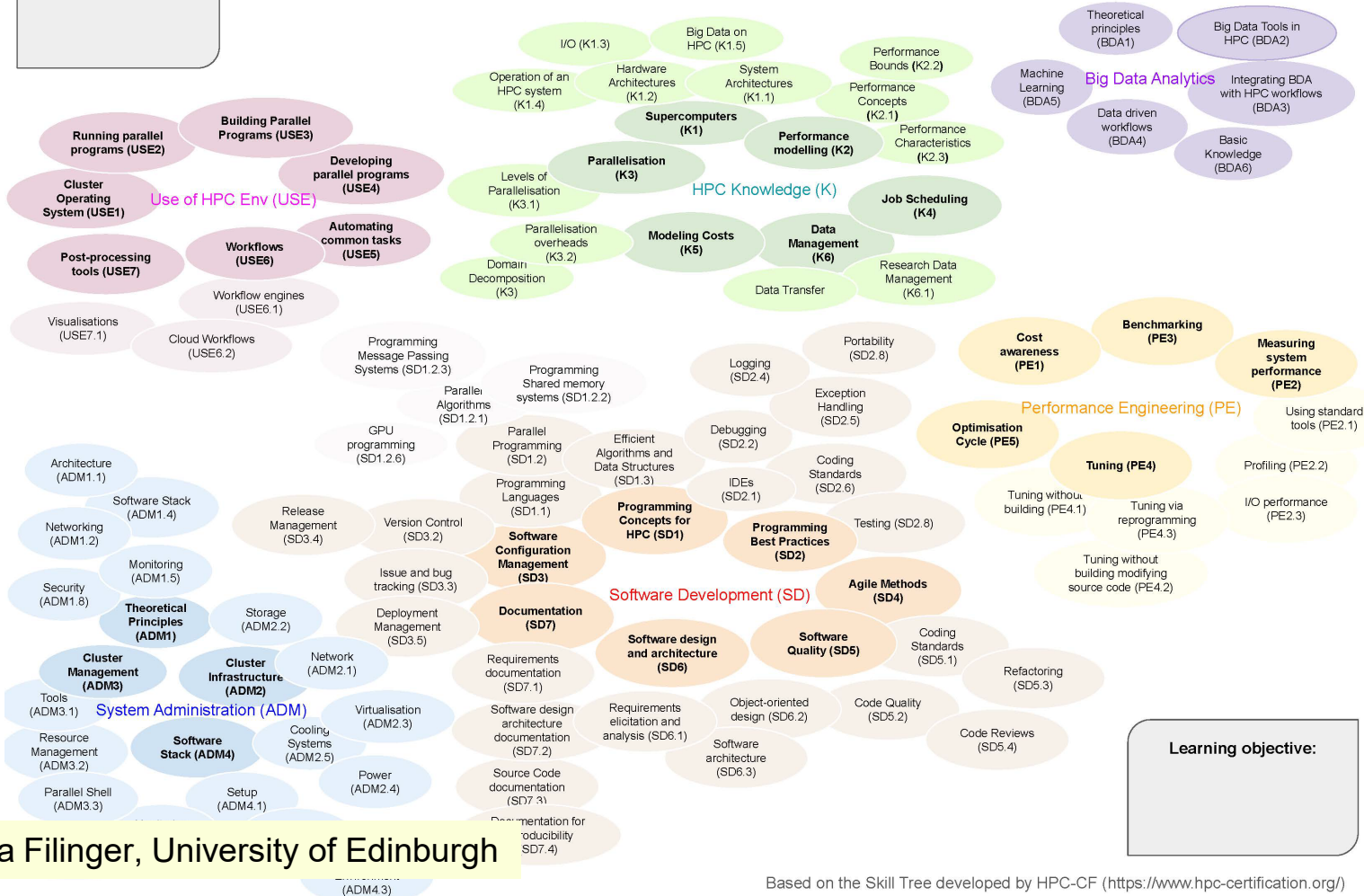
“Project Management” RSEs: who focus on managing research software engineering projects or groups.

“Knowledge Management” RSEs: who focus on ensuring knowledge is maintained through documentation, training or community building.

Career paths for research software engineers, compared to UK academic career path

Starting point:

ISC24 Learning Pathways BoF - Build Your Pathway!

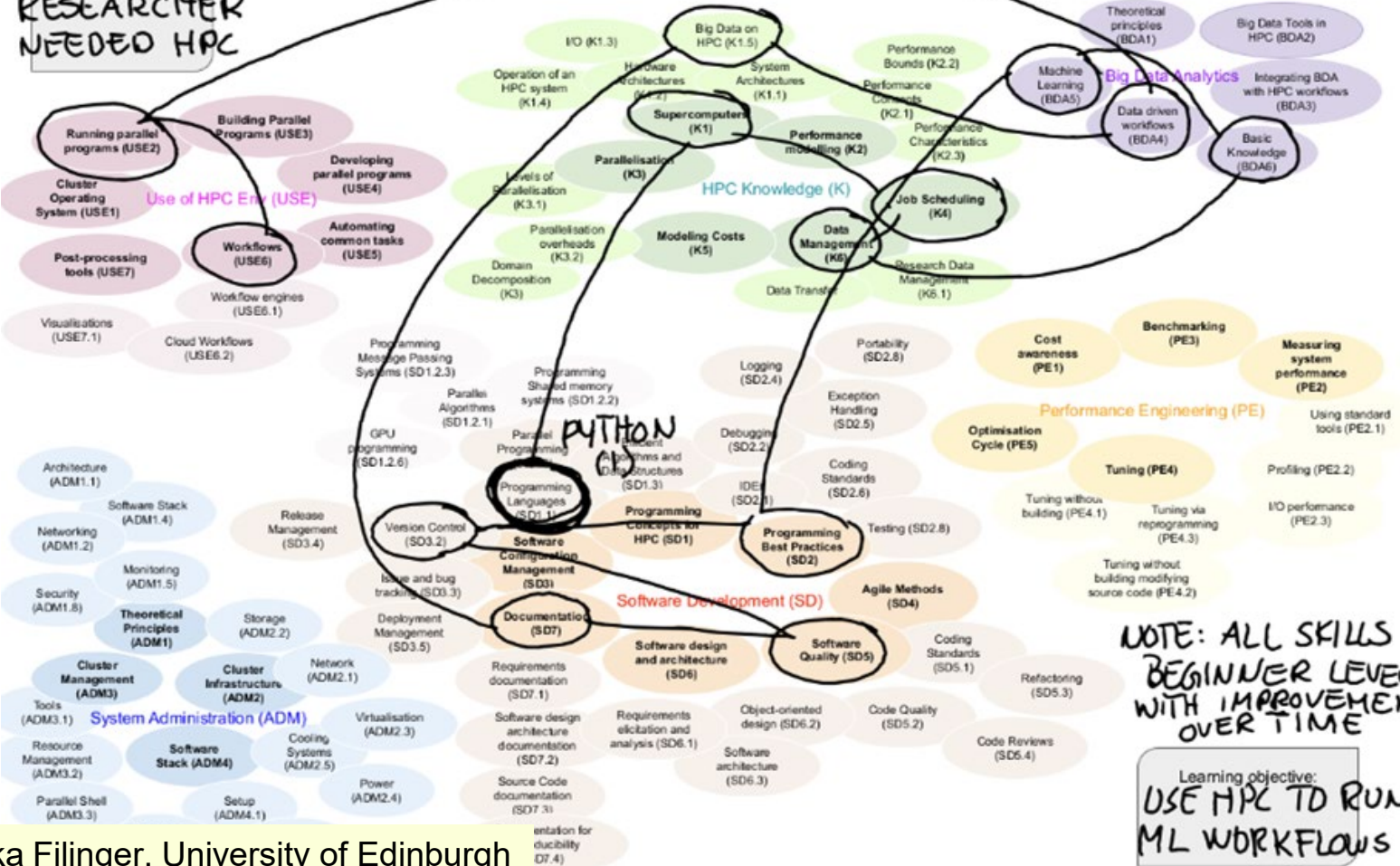


Learning objective:

NON-COMPUTATIONAL RESEARCHER NEEDED HPC

ISC24 Learning Pathways BoF - Build Your Pathway!

Starting point:



Weronika Filinger, University of Edinburgh

Gutenberg: Open-source website to render material, host course events, student tracking & interaction

Repo: <https://github.com/OxfordRSE/gutenberg>

Oxford deployment: <https://train.rse.ox.ac.uk/> Southampton deployment: <https://www.uhpc-training.co.uk/>

 Home



Course Events

Login to request a place on an upcoming course, or to select an active course.



Oct 3, 2024, 9:00 AM

Healthcare Data Science CDT: Software Engineering

Software engineering training for the Healthcare Data Science CDT

Oct 14, 2024, 9:30 AM

DTC Software Engineering Course

An introduction to software engineering for 1st year DTC students

Course Material

This is the teaching website for the [Oxford Research Software Engineering Group](#). Please see our list of past and upcoming courses on the left.

The material for these courses is generated from a set of [markdown materials](#) collated by the [UNIVERSE-HPC project](#), a joint collaboration between RSE teams at Oxford, Southampton, Imperial and Edinburgh, the Software Sustainability Institute and the Edinburgh Parallel Computing Centre.

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[View the teaching materials](#) →



- **Software Architecture and Design:** Procedural Programming; Object-Oriented Programming; Functional Programming
- **Technology and Tooling:** The Bash shell; Version Control; Packaging and Dependency Management; Best Practices; IDEs; Testing; Containerisation with Docker; Snakemake Tutorial
- **Software Project Management:** Collaboration on GitHub; Continuous Integration
- **High Performance Computing:** Introduction to High Performance Computing; HPC Scalability Profiling
- **Introductory Course:** Intro to Python

" I really enjoyed it because it gave us all the ability to work at our own pace, and support was provided quickly whenever needed."
- Foundational HPC pilot learner

"Fantastic pilot course, some small improvements could be made ... but overall fantastic."
- MPI pilot learner

Pilot Operations Guide

- Aimed at those piloting new training, and established trainers
- Key topic areas
 - Planning and preparation
 - Methods of delivery
 - Delivering a pilot
 - Post-workshop activities
- Future work
 - Specific activity templates and other resources
 - Refine based on community feedback

Steve Crouch, University of Southampton

Guide for Running Training Pilots

By Steve Crouch and Philly Broadbent.

You have worked hard to develop a training course or module you wish to try out, or pilot, for the first time. So what should be done to deliver a successful pilot that differs from an established workshop? This guide aims to help you navigate the many decisions related to planning, organising and delivering a pilot workshop, so that both the learners and the training team get the most out of it.

Whilst this guide is aimed at those involved in training pilots, many aspects also apply to training in general, so may also be helpful for those running established training events.

Planning and Preparation

In his treatise the Art of War, Sun Tzu said that "every battle is won before it's even fought", and so it is with training pilots - early preparation is key. That's certainly not to say that a pilot is a battle against learners, or if it is a battle, it's a battle with learners against barriers to knowledge, both from the perspective of the learners wanting to improve their skills, and the training team wanting to understand how the course needs to improve. But perhaps a better way to see a training pilot is as a collaboration between the instructors and the learners, where decisions related to planning aim to maximise the exchange of knowledge in both directions: from the training materials and training team to the learners, and from the learners in terms of feedback to the training team (and by extension, the training materials).

Based on this aim, the goals of a training pilot are typically twofold:

1. **For the learner:** deliver a positive learning experience for attendees that is measurable against the learning objectives for the training
2. **For the training team:** Gather actionable feedback to improve the organisation, delivery, and training materials for future events (and sometimes, the same event)

The next sections will cover key decisions that need to be made to accomplish these goals, and during planning it's a good idea to capture decisions within a pilot brief. A pilot brief is a short, living document that evolves during the pre-workshop stages and forms a single agreed point of reference for those involved.

What will be Piloted?

Often when pilots are being planned there is an understandable focus on the learning content and training materials that are being piloted, but it's a good idea to ensure that how it will be organised, delivered, and assessed receive equal attention.

For a group developing an entirely new course for the first time, this would obviously involve piloting many of these aspects for the first time. However for more established groups, or projects that aim to deliver multiple training events, some aspects may be reused alongside established ones, so it's a good idea to discuss and explicitly record in the pilot brief how each aspect will be handled. Examples may include some or all of the following:

- For content, it could be a whole course of new modules, new versions of existing modules, or perhaps piloting a selection of new modules that will form part of a larger course in the

Byte-sized RSE

- A series of **online sessions** to provide members of our community with core skills on key topics in around 1 hour
- 2 series completed - 8 episodes per series
- Companion podcast episode developed with Code for Thought for each session

Jeremy Cohen, Steve Crouch and others



Session 2: Python web apps with Django

Byte-sized RSE season 2, session 2 provided a basic introduction to web application development using Python's Django framework.

Byte-sized RSE

Season 1:

1. Software Licensing
2. Collaboration and Code Review via GitHub
3. Testing Your Python Code
4. Continuous Integration
5. Code Style and Linting
6. Integrated Development Environments (IDEs)
7. Intermediate/Advanced Git
8. README Files

Season 2:

1. Software Task Estimation
2. Python Web Application Development with Django
3. Introduction to EasyBuild
4. User Experience (UX) Design
5. Citation File Format (CFF) and cffinit
6. Property-based Testing in Python
7. FAIR Research Software
8. Python Packaging and pip

Byte-sized RSE

- Registrations: between ~110 for popular sessions and ~25 for niche topics - estimate engagement with >500 people - many regular attendees
- Series 3 - 6 sessions - currently in planning

Events and activities

- **Project seminar series** - sessions hosted by our project team sites
 - Experimented with hybrid but the community is widely distributed - we've seen much less interest in in-person attendance
 - Seminars held through Edinburgh, Imperial, Southampton - Oxford in Oct 24
- **Hackathons** - get-togethers, either in person or hybrid, to work on project infrastructure, pedagogy, accessibility of materials - small groups but extensive work undertaken - strong impact for project infrastructure

Upcoming talk!

Move the Needle - Lessons in Diversity, Equity, Inclusion and Accessibility

Speaker: Cristin Merritt, Chief Marketing Officer of Alces Flight and Advisory Board Member for Women in HPC

Date: Thursday 24 October 2024, 14:00-15:00 BST (online)