CIMComp
EPSRC
Future Composites
Manufacturing Research Hub

Staff Development Policy

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Date: July 2020
Version: 1.0

UKRI Engineering and Physical Sciences Research Council

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1 Introduction

This Staff Development Policy describes the principles, framework and anticipated arrangements for development of affiliated staff and postgraduates within the EPSRC Future Composites Manufacturing Research Hub (CIMComp). The policy supports the Hub's objectives to:

- Promote a step change in composites manufacturing science and technologies.
- Create a pipeline of next generation technologies addressing future industrial needs and developing the national composites strategy
- Provide doctoral training for the next generation of composites manufacturing engineers
- Build and grow the national and international composites communities

2 Our Vision

The Future Composites Manufacturing Research Hub is a £10.3m investment by the EPSRC which seeks to engage academics from across the UK to deliver a step-change in the production of polymer matrix composites. The UK Composites Strategy (2016)[1] outlined ambitious growth forecasts for the composites sector, with a projected market value of £10 billion by 2030. However delivery of this growth will require a skilled workforce considerably larger than is currently available. Therefore, one of the biggest challenges facing the sector is the requirement for more, and better trained engineers who are able to deliver industrial growth. The Hub has committed to train over 150 researchers and postgraduates during the lifetime of the project to help meet this requirement.

By establishing a framework for staff development, we aim to create an environment where postgraduates, researchers, academics, and other staff are supported to grow professionally during their affiliation with the Hub. We are also committed to the continuous improvement of our staff development provision and encourage feedback from staff.

3 Scope

Due to the nature of the Hub, the policy does not seek to replace the existing staff development plans in place at each member's home institution, who ultimately have responsibility to deliver staff development initiatives. However, the policy aims to provide information to Hub staff and postgraduates about how the Hub can support their career development. It is therefore relevant to all academic researchers, administrative and business development staff, technicians, and postgraduates.

4 Responsibilities

Staff development is a shared responsibility that draws on both an individual's desire to learn and develop, and a strategic identification of where development would be beneficial by other stakeholders. However, there are specific roles that staff at certain levels can play within this policy:

- Senior Academics – in promoting a climate, and providing space and resources, to ensure that continuing learning and individual development is recognised as an important part of the Hub.

[1] https://compositesuk.co.uk/system/files/documents/Strategy%20final%20version_1.pdf

- Early-Career Academics, Researchers, Postgraduates and Other Staff– by taking responsibility for identifying areas where their work might be developed, making themselves aware of and taking advantage of suitable opportunities and applying their learning in their work

5 Identifying Development Needs

We anticipate that there are two methods by which development needs are recognised and acted upon: Identification by senior staff and self-referral. In addition to these, development may occur passively through Hub events which offer opportunities for individuals to expand their skills or knowledge.

5.1 Identification by Senior Staff/Manager/Supervisor

In these cases, a member of senior staff will identify a specific skill which they believe would be beneficial for the staff member in question, in the context of the Hub's aims and direction. It will therefore be their responsibility to raise this constructively with the staff member involved and develop a plan to help them to access appropriate training or development activities.

5.2 Self-Referral

In cases where a student, researcher or investigator believes there is a need or an opportunity for them to develop their skills, this should be raised with a senior staff member for further discussion. It may be useful to use a tool such as a training needs analysis using the Researcher Development Framework (RDF) developed by Vitae. This will enable a plan to be created and we encourage the use of the following framework to guide this:

1. Attitude: how do they need to "feel", what should they think in order to be at their best doing this task?
2. Skills: what does this person need to be able to do?
3. Knowledge: what do they need to know to be able to do it?

Given that provision for 'soft' skills training is likely to be managed by the individual's own institution, we anticipate that most (but not necessarily all) development needs in this case will focus on technical skills (e.g. software packages, analytical techniques etc.).

6 Staff Development Provision

It would be too simplistic to assume that every 'job family' of employees within the Hub has the same developmental requirements. Postgraduate students for example have different needs to those of senior academics. This section outlines potential development activities that can be accessed through involvement with the Hub.

6.1 Postgraduate Students

In addition to their own research, EngD students complete 10 Masters-level units, each lasting one week. These units, in addition to assignment preparation, conference attendance, and dissemination and STEM activities account for 25% of the degree. The taught units are delivered by leading academics and industrial speakers, and are run at the University of Bristol, with the Business Skills units taking place at the University of Bath. It is important to note that units from the IDC can be taken

as part of CPD by Hub academic staff, researchers and students associated to support staff development. The taught component comprises the following series of one week-long technical units:

- Constituents of composites is a foundation unit, which covers the chemistry and materials science underlying the design of lightweight structures and components manufactured from fibre reinforced polymer composites.
- Manufacturing of composite structures enables students to understand the manufacturing procedures and tooling requires to produce complex composite components utilising liquid resins and prepreg.
- Laminate analysis, modelling and design of composites this unit introduces the analytic methods, data and software tools for design of laminated composite structures.
- CAD for composites design and manufacture provides comprehensive introduction to the state-of-the-art tools for digital composite design and manufacture to promote understanding of composite product development.
- Mechanical performance of composites introduces the experimental techniques used to obtain the stiffness and strength properties of laminated composites, including the use of test standards, to provide inputs into design, modelling and quality assurance.
- Process modelling and control in composites manufacture state-of-the-art commercial and bespoke process modelling. This incorporates the mechanics of consolidation during a variety of manufacturing processes, including precursor deformation at component and structural scales, heat transfer and cure, residual stress and distortions, and defect generation and mitigation.
- Design for manufacture of composites covers aspects of digital design, focusing on the impact of manufacturing on the product design and development process. This includes cost modelling and probability of defects, numerical analysis tools to understand structural performance, automation and digital process control.
- Technology Strategy and Organisation introduces supply chain management, marketing, sustainability and life cycle costs. The focus is on entrepreneurial activity and how technology can enhance organisational capabilities, including the impact of standards on competition, alongside political and cultural considerations.

The Hub's synergy workshops provide an opportunity for postgraduates to hear about research activity being conducted, and to discuss their own research with the Hub community. As postgraduates are understandably focused on their own projects, it can be difficult to appreciate the importance of their work in the wider sphere of the Hub. Therefore, synergy workshops help postgraduates to view the 'bigger picture' and influence their research appropriately. Students are also given the opportunity to present a poster and two-minute introduction pitch at the annual Hub open day, giving them experience of presentation and exposure to academic and industrial audiences.

All PhD and EngD students have the opportunity to engage with the Hub Researcher's Network. This is a network organised for and by researchers and which aims to deliver developmental activities and opportunities for networking and collaboration. Unique to the Researcher's Network is the opportunity for students and researchers to apply for a small amount of funding (up to £5,000) to enable them to pursue a piece of research or activity outside of their usual project. This could also

allow them to purchase, for example, materials to develop their research in a way which would not otherwise have been possible.

Hub funded students are eligible to undertake a placement during their studies, either to an industry partner, or to one of the Hub's international academic partners for up to three months. These opportunities allow the student to gain industrial experience or access specific facilities or expertise. These opportunities are managed through the Hub's Postgraduate Development Committee (PDC) who in conjunction with the Management Board determine whether requests for placements are appropriate. In both cases, the objective of the placement must be aligned with the aims of the student's research and thesis.

6.2 Researchers

The Hub Researchers Network brings together researchers from all fifteen Hub-affiliated universities and serves as an effective mechanism for promoting collaboration, training, and enhancing the cohort experience amongst researchers. It provides researchers with opportunities to extend their network of professional contacts, exchange ideas and discuss their projects with peers. Workshops are organised and designed to develop composite manufacturing skills, and a series of 'design and make' challenges have taken place. These offer practical experience to those who might otherwise only be involved in simulation-based projects. The Network also supports outreach activities such as school and STEM events.

Hub researchers are eligible to undertake an industrial placement during their project for up to three months. These opportunities allow the researcher to gain industrial experience and to build relationship with industry partners.

The Hub's Synergy Workshops provide an opportunity for researchers to hear about research activity being conducted, and to discuss their own research with the Hub community. The nature of these events challenges academics to consider other researcher's work within the context of their own and to actively identify opportunities for synergy.

6.3 Academic Staff

Although the development needs of early-career and senior academics are fundamentally different, we anticipate that these will be met through focused training activities provided by the relevant institution. Therefore, we consider both early-career and senior academics as a single group in this policy.

The Hub's Synergy Workshops provide an opportunity for academics at all levels to hear about research activity being conducted, and to discuss their own research with the Hub community. The nature of these events challenges academics to consider other researcher's work within the context of their own and to actively identify opportunities for synergy.

The Technology Pull Through programme which invites proposals annually is a valuable opportunity for academics to consider how their research can be relevant to industry end users, and how results can be scaled up towards a higher technology Readiness Level (TRL).

6.4 Other Staff

In addition to research and academic staff, the Hub also employs a number of administrative and managerial staff. Since many of the opportunities outlined in the above sections are not relevant to career development in this job family, it is important that suitable opportunities are identified. The Hub will support access to specific training where this is relevant to the direction of the Hub (e.g. project management and leadership. Staff have also been offered opportunities for mentoring by senior staff (potentially external to the Hub) to help develop skills in a certain area.

7 Evaluation of Staff Development

Having outlined a number of ways in which development needs can be identified and acted upon within the Hub, it is also important to evaluate the effectiveness of the policy. As part of ensuring appropriate support, and maximising the learning from staff development activities it is suggested that managers or supervisors take an active part in de-briefing individuals before and after engaging in development activities. This will likely consider:

- Whether the development needs have been met.
- The skill(s)/knowledge/experience/qualification gained from the development and how this can be applied to the objectives of the Hub.
- Any help or support needed to apply the new learning.

8 Action Plan

1. All Hub affiliated staff and students to be made aware of Staff Development Policy.
2. Clear signposting within Hub to opportunities for career development and where to seek specific guidance.
3. Develop appropriate evaluation tools to be used by staff.