

ELECTRON MICROSCOPY TRAINING AND STUDENTSHIPS

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The Electron Microscopy Training Partnership

To ensure that the UK's advanced electron microscopy (EM) equipment and expertise is effectively exploited, now and into the future, for the benefit of UK research and business, a national partnership is proposed to support both Continued Professional Development (CPD) and PhD training.

The model is of a virtual, distributed EM Training Partnership (EMTP) with partial funding from RCUK.

The focus of the proposed structure is materials systems. However, partial overlap or complete merging of this training structure with that described by BioimagingUK may be beneficial.

The Main Aims of the EMTP

- Expand the number of PhD level EM experts in the UK and to improve high-level EM training more generally, especially through Continuous Professional Development (CPD).
- Provide a high-quality, comprehensive and widely-recognised learning resource in EM.
- Create a network to include, involve and connect the whole UK EM community.
- Improve awareness of the capabilities and accessibility of EM to the UK research and business communities.
- Pool educational and research resources to ensure academic excellence in combination with cost and time savings.
- Ensure effective representation of EM to external organisations, with the aim of attracting continued UK and international funding.
- Accommodate a wide range of PhD and CPD subjects and projects.

Funding

To make the desired impact, attain critical mass, realise economies of scale and to be inclusive of the whole UK EM community, the EMTP must be substantial.

- Aim to train 20-30 PhD entrants per year for the first five years.
- Support at 50% would be sought from RCUK (£1-1.5m per cohort)*.
- Student funding from other mechanisms will be attracted in by the benefits of association.
- Universities would be invited to join the EMTP and get the benefit of the network (studentships, access to the VLE, CPD opportunities for staff *etc.*)...
- ... in return they would commit to host projects, provide instrument access, courses or teaching material and perhaps contribute matched studentships (condition of membership?).

*PhD: 4 years × £[stipend (14k) + Uni fees (4k) + **EMTP fees** (6k)]
+ inflation

Elements of the EMTP Structure

As students will be distributed nationwide, teaching will require:

1. A comprehensive course in a VLE on a free subscription model for EMTP members, to contain:

- Core lecture courses (slides/video) on the main aspects of EM, including supporting theory, with online submission and assessment of student work. Material contributed by EMTP partners.
- A reference section including student literature reviews, technical notes, instrument details, sample preparation techniques, analysis methods, 'tricks of the trade' etc. Multimedia and student submissions encouraged.
- Links to useful EM tools such as relevant software, and external sites to augment training.
- A programme of webinars.
- Online Forum to facilitate enquiry-based learning group assignments and for exchange of ideas, results, Q&A sessions, etc.

Elements of the EMTP Structure

As students will be distributed nationwide, teaching will require:

2. Residential courses, workshops and conferences. Two, week-long residential courses during the first year (modelled on highly successful RMS and SuperSTEM courses) and an annual student conference event with workshops on emerging topics, specific techniques, specialisms. Long-standing EMAG and RMS events will be incorporated into the programme.

3. Regional Training Centres (RTCs). About ten RTCs will provide hands-on EM training, concentrating on the fundamentals, within reasonable travelling distance for the students.

4. National Training Centres will provide high-level, specialist short courses, offered nationally.

5. Miniproject. At another centre will be part of initial training. 4 weeks.

6. Research Project. 6 month pre-PhD research project at home institution.

6. Research Visits. Competitive funding will be available to support ~10 week PhD and CPD visits at other EMTP members.

PhD Structure

Content. Agreed credit model with assessment, courses carefully selected by the supervisors and student considering PhD project. Flexible programme to allow inclusion of elements offered by the student's university. Care taken not to overload student and to ensure material is relevant.

Supervision. First and second PhD supervisor with complementary expertise, normally at different institutions, both within the EMTP.

Awarding Body. Home university with certificate from the EMTP.

Time format. 1+3 (MRes+PhD) or 0.5+3.5 year format. Freestanding MRes. attractive for CPD *etc.*

Research Placements. Mechanism to allow applications for research visits across EMTP during the research period of the PhD.

RMS Diploma. Requirements: reports on one RMS residential course, one RMS meeting (e.g. Microscience), 8000 word project report, 2000 word technical essay, 2000 word broad-appeal article, outreach activity. Normally two years CPD. Arrange the first 18 months of the PhD studies to comply with Diploma? (first year report = project report, Miniproject reports = essays *etc.*).

Example PhD Structure

