

## **Higher Education Commission: inquiry into postgraduate education**

### **Response from the Royal Astronomical Society**

The RAS is the largest UK organisation that represents astronomy, space science and geophysics and has more than 3700 Fellows (members) who work in these areas, including approximately 200 postgraduate students. We are therefore very happy to respond to the call for evidence for the inquiry into postgraduate education.

#### International Competitiveness

#### **Q2a: What is required for the UK to maintain its ability to attract and retain high-quality international students and international researchers?**

In sciences like astronomy and geophysics, a key factor is the strength of the research base and participation in major international collaborations such as the European Southern Observatory and the European Space Agency.

UK astronomers are ranked second in the world in terms of the number of scientific papers they produce and first in the world for the impact those papers make. This high productivity is a measure of the vibrancy of research in British higher education institutions and laboratories and has helped bring talented postgraduates from across the world. For example, the RAS demographic survey identified 1228 research students in the fields of astronomy, space science and geophysics, about 28% of whom were domiciled overseas.

The Society is concerned that the proposed changes to Tier 1 visa regulations by the UK Border Agency that will limit the time that the most talented researchers can remain in the UK as employees to five years may deter overseas (i.e. non-EU) applicants from considering postgraduate study at British universities.

#### **Q2c: How might UK-domiciled students be encouraged to engage in doctoral study?**

UK-domiciled students will be encouraged to consider doctoral study in astronomy and geophysics if they see opportunities to join well-funded research groups that are involved in cutting edge science. Students will also be keen to see good employment prospects for doctoral graduates, whether they choose to remain in research or seek careers in the wider economy.

It is also essential for the research councils (in the case of astronomy and geophysics the STFC and NERC) to continue to support a sufficient number of PhD studentships with an adequate level of maintenance grant.

#### **Q2d: In what areas can UK postgraduate students be considered outstanding internationally?**

PhD students in astronomy and geophysics work alongside and co-publish with some of the most talented and productive researchers in the world.

UK research council-supported astronomy and geophysics PhD students are allowed “field trips” which can involve observing runs at one or more of the world’s leading observatories or field work at sites of geophysical interest. This gains them vital experience in practical astronomy and / or geophysics. In order to interpret and visualize the large volumes of data such programmes produce, UK PhD students are trained to use state-of-the-art software and graphics packages, and to develop their own computer programmes.

Other student projects may include direct involvement in international space missions and major modelling efforts, creating new tools for the entire community. Many of these will be run on the high performance computing facilities grouped under the DIRAC (STFC-funded) consortium.

Recognising their responsibilities to the wider community, UK PhD students are encouraged to take part in outreach activities and – uniquely in the world – are often provided with training courses to help them to do this and to become generally more media savvy and friendly. PhD students make inspirational role models in schools, where they often act as “science ambassadors”.

Together, these varied programmes ensure that UK astronomy and geophysics PhD students are (amongst) the best equipped in the world with a multitude of transferable skills that make them highly sought after as employees, whether they choose to remain in academic research or go elsewhere.

On the basis of this broad experience, we argue that postgraduates in astronomy and geophysics can beyond doubt be considered outstanding internationally.

#### Impact of the planned HE reforms

#### **Q5: What impact will the changes to undergraduate provision outlined in the recent Higher Education White Paper have on the postgraduate sector?**

The impact of greatest concern to the Society is that the new far higher undergraduate tuition fees (almost all courses in physical sciences charge £9k per annum) may deter students from pursuing postgraduate study, particularly at PhD level. This risk was identified in the Browne review of university finance that recommended monitoring of applications to postgraduate courses.

At MSc level the risk is particularly high, given that so few of these courses attract studentships, even those with a high demand by employers in areas such as geophysics. Students can easily pay £10k in fees for a one year MSc course and (at least) a further £6k in maintenance. This represents a significant additional debt for graduates who are likely to already owe between £45k and £60k in fees and maintenance for a three year BSc course.

For many students the only way to access these funds is through the Professional and Career Development Loans offered by two UK banks. Although interest is not accrued during the course itself, the students are expected to begin repaying their loans from two months after their course ends and at commercial rates of interest.

If there is no prospect that studentships will be reintroduced for these courses, then we suggest that MSc students should at least be able to access the low-cost loans available to undergraduates, particularly in vocational courses like geophysics.

### Cross-cutting issues

#### Funding

#### **Q6: How should postgraduate education be funded?**

For PhDs, the Society emphatically supports the present system of studentships funded by research councils. In subjects like astronomy there is little prospect of commercial support as the economic benefits from this research area is serendipitous rather than predictable and may only become apparent over long timescales.