The development of my research career has been closely intertwined with engagement with students across levels 4, 5, 6 and 7 and involvement in the development of curricula for individual modules as well as leading change in the re-validation of our existing programmes. For an academic career it is essential that new students progress through these levels and develop an innate desire to question and understand. As noted in my Reflective Account of Practice, it is more than simply understanding, but recognizing where there are gaps in knowledge ("ignorance"; Firestein, 2012) and extending into those gaps and exploring them. It has been noticeable across modules that students entering level 4 are focused upon the acquisition of knowledge and production of a good answer. For example, in Secondary School it is common to teach students to PEEL - Point Evidence Explain Link. This develops a framework for producing a good answer, but doesn’t develop curiosity-driven understanding. With transition level 5 students feel greater pressure from being responsible for their own learning and their own performance. Marks now count towards their degree classification and there is a significant academic leap that marks the current "body of knowledge". There is a leap of a similar size in to level 6 that often marks the extent of knowledge, with students having to become increasingly aware of evermore detailed areas of academic study - and it is only at the boundaries of knowledge that you can begin to recognize areas of ignorance and then develop a research agenda. Ignorance provides an individual foundation for independent study and this is dependent upon the individual experiences, personal interests and innate curiosity of each student – it is a heterogenous map of learning.

This journey begins at the end of year 5 when many students are introduced to the dissertation - by this point they have studied much of the core knowledge and introduced to the techniques that are used in their area of study. In short they are ready to undertake research, even if they aren’t immediately aware of why they are doing so. It is this area of undergraduate teaching that I have been keen to explore further and have been directly supported by a Nuffield Science Bursary (Buchanan) and Kingston University Faculty Summer Internship (Ardacova) to supervise students working on "live" research projects; these are awarded based upon the grade profile of the student. This engages students as they appreciate the value in undertaking "real" research - in addition, over a period of weeks they are gradually given more responsibility and allowed to develop and evolve the research project based upon the work they have completed. This work resonates strongly with the idea of the research-teaching nexus (Jenkins and Healey, 2005, 2009) – however it is outwith the nexus Healey (2005) explores and does not centre upon research knowledge or processes, but rather bringing the student into the research, making them aware of the research workflow and allowing them the luxury of pursuing a focused goal and appreciating that this can lead to different outcomes.

The work with Buchanan was supported in-kind by the European Space Agency and further collaboration with the Ordnance Survey. The student collaborated directly with
the partners and developed a strong research plan which he investigated during his
tenure. The student secured a First Class dissertation and degree and was subsequently
employed.

The work with Ardacova involved the development of a custom computer program in
collaboration with Dr Stephanie Mills (Kingston University). An outline of the algorithm
was provided and the student went on to develop the program, liaising with an
external academic. The work was presented as a poster at an international conference
and has been submitted to a journal for publication. The student secured a First Class
dissertation and degree and was subsequently employed.

In addition, I have worked closely with two undergraduate dissertation students who
developed very promising research ideas. Harrison compared algorithms for processing
terrain data of Mars; she gave an oral presentation at an international conference. The
student secured a First Class dissertation and degree. In the final summer of her
degree she worked voluntarily on a research project analysing historic geological
records - this work has subsequently been published. She has now completed an MSc
and PhD and is a post-doctoral researcher. Glanfield was a mature, part-time, student
working within an industry affiliated field. He reviewed the automated use of satellite
imagery for producing maps - this work was presented as a poster at an international
conference and subsequently published as a paper in the proceedings of the
conference. The impact of these research activities has made a lasting impression on
the individuals as evidenced by my continued links with them as they develop their
respective careers.

The development of a research profile is about enabling students to make the staged
"jumps" as they progress from level 4 through to level 6. Doing so within the
framework of achieving a "good" degree requires determination, hard work and an
identification of "what they do best and enjoy" (Robinson and Aronica, 2010). Enabling
the student to make the transition to curiosity and to develop the creativity for devising
research methods and workflows is difficult. This is within the context of understanding
that research is collaborative - whilst groupwork is part of the curriculum, if often only
extends to the collection and collation of data, not to the production of a final report.
Yet collaboration is common, indeed often a requirement, in academia. Across all of
these research projects, other academics both within the university and external to it
have been involved. This both emphasises the importance of collaboration and
integrates other staff in to the development of individual students. Development as a
researcher therefore requires mentoring - this is not trivial.

The final stage of the academic process, that closes the loop, is dissemination - this is
vital to the professional researcher and the importance of the process cannot be
understated. In the above examples, wherever possible dissemination was sought at
the highest possible levels, including oral and poster presentations at international
conferences, and the publication of papers. More widely, in my role as Editor-in-Chief
of the Journal of Maps, I established the Student Section (Smith and Lynch, 2007)
which encourages submissions from undergraduate and postgraduate students. This is
intended to develop good practices in the writing and submission of manuscripts,
offering a “first step” to publication through a supportive internal peer-review process –
the best manuscripts are then forwarded to the full externally peer-reviewed journal for processing.

As an academic it is both personally and professionally satisfying to engage and mentor students as they progress from recipients of knowledge to active creators of knowledge - not all students wish to become academics, but being able to help develop individuals in to full and creative research professionals is profoundly gratifying.

References

Firestein, S. (2012) Ignorance: How It Drives Science, OUP USA


