Why do we need Graduate Schools?
Our experience at Imperial

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The role of universities in a knowledge society

Knowledge forms the basis for

- Personal development and success
- Competitiveness at institutional, national, European and global level

Modern society requires

- More highly skilled professionals
- Greater innovative capacity

Universities are critical in providing

- Intellectual capacity
- Research potential
- Linking education and research activities to societal needs, and their application in industry, commerce and enhancing the quality of life
- Knowledge triangle

The role of universities in research training

Provision of:
- Quality research environment
- Quality training in research
- Interdisciplinarity
- Transferable skills

An effective structure for delivery:

- 2 different major structures for postgraduate students
  - Overarching, interdisciplinary, normally in a single university
  - Specialist subject-focussed, may involve 1 or more universities (depending upon size of the universities)
- Functions are consistent, but nomenclature varies!
  - Many names e.g.
    » Graduate Schools
    » Doctoral Schools
    » Graduate Academy
- Some universities have both

Why do we need Graduate Schools?

- Introduction to Imperial
- Overview of Graduate School structure and function
- Graduate Schools and their role in PG education
  - Quality
  - Integrated voice
  - Interdisciplinarity
  - Transferable skills to support research training

Our History

1851-1890
Constituent Colleges formed, realising Prince Albert's vision for the pursuance of science and learning following the Great Exhibition

1907 – Imperial College founded by merger of:

- City and Guilds College
- Royal College of Science
- Royal School of Mines

1988-2000 Mergers with London Medical Schools:

•St Mary's Hospital Medical School

•National Heart & Lung Institute

•Charing Cross/ Westminster Medical School

•Royal Postgraduate Medical School

•Kennedy Institute

Our Estate

Seven London campuses:
  Charing Cross
  Chelsea and
  Westminster
  Hammersmith
  Norhwick Park
  Royal Brompton
  South Kensington
  St Mary's

One campus in South East England:
  Silwood Park, Ascot

Our staff at Imperial

8,200 staff and visiting staff

- **3,000** academic and research staff
- **3,000** support staff
- **1,700** honorary staff
- **700** academic visitors
  and visiting researchers
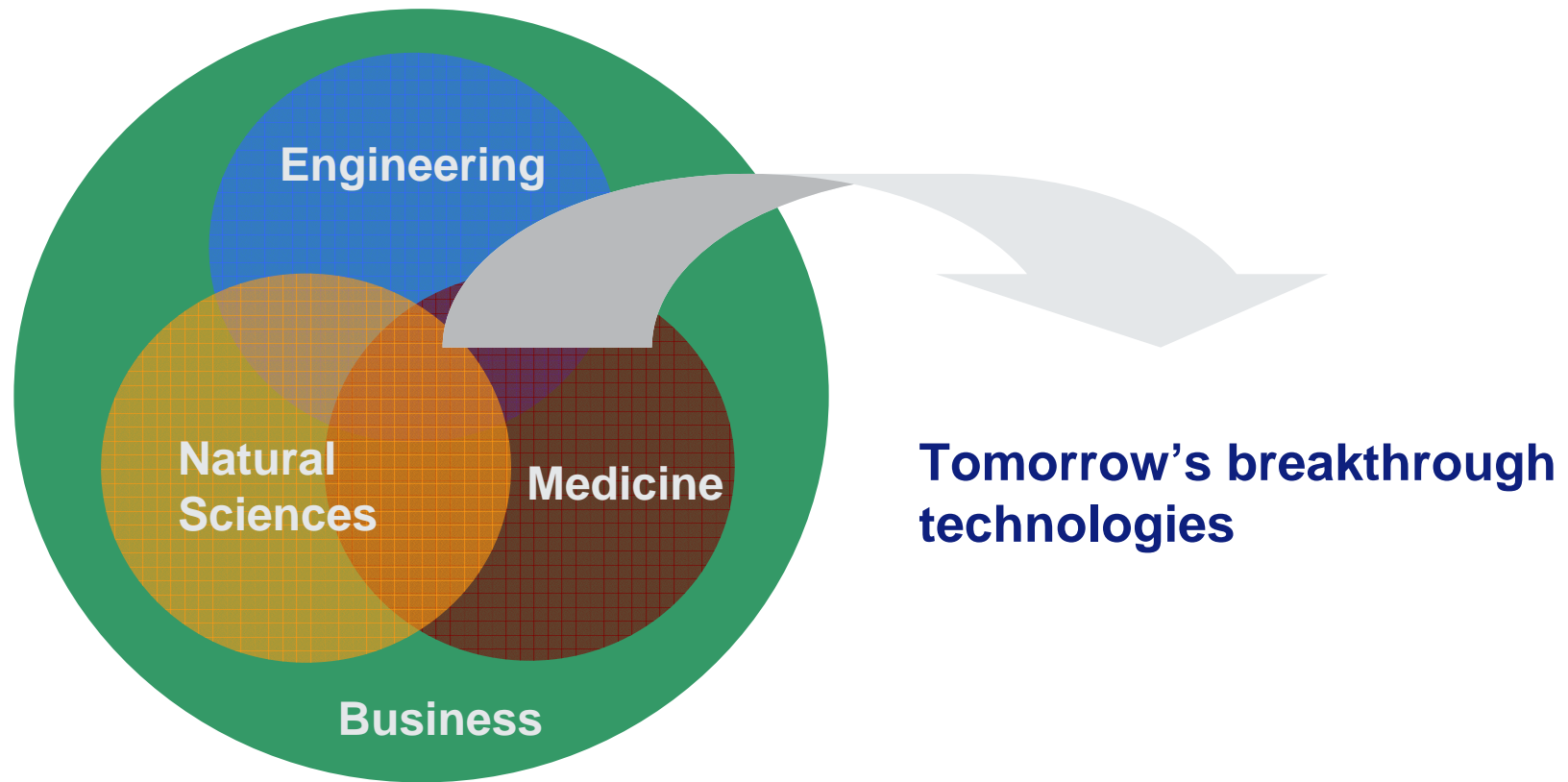
Our students at Imperial

13,000 students:
- 8,300 undergraduates
- 2,200 taught postgraduates
- 2,500 research postgraduates

PG students (masters and doctoral):
- 36% of total student population at Imperial

- 46% UK
- 24% Europe (outside UK)
- 30% overseas (outside Europe)

Our Graduate Schools at Imperial

- Graduate School of Life Sciences and Medicine (GSLSM):
  - 1999/2000
  - Faculties of Medicine and Natural Sciences (life sciences divisions)
- Graduate School of Engineering and Physical Sciences (GSEPS):
  - 2002
  - Faculties of Engineering and Natural Sciences (physical sciences departments), and Business School
- All postgraduate students (masters and doctoral) belong to one of these

Faculties and Graduate Schools

All students belong to:

- A Department/Division within a Faculty
    - Research
    - Specific academic training (e.g. lectures, journal clubs, internal and external seminars)
- A Graduate School
    - Quality Assurance
    - Integrated 'voice' within College
    - Skills training
    - Interdisciplinary activities

Quality assurance

Quality assurance: masters programmes

- Review of all current masters programmes
  - Annual initially
  - 3-year cycle, after 'excellent' review
  - Based on: course programme, quality and number of students; course materials; examination results; student feedback (on-line review); external examiners reports
- Review of all new masters programmes
  - Internal review via Graduate School
  - External referees' assessment
- Quinquennial external review

Quality assurance: doctoral programmes

- Review of doctoral programmes
  - Faculty and departmental procedures
  - Faculty and departmental completion and success rates
- Review of student progress
  - Registration; approval of student, supervisor, project and facilities
  - Transfer to PhD status, reviewed at 12-15 months - to ensure student's progress is satisfactory and that plan for completion of PhD is appropriate
  - 6-monthly student:supervisor review; with confidential feedback for student if required
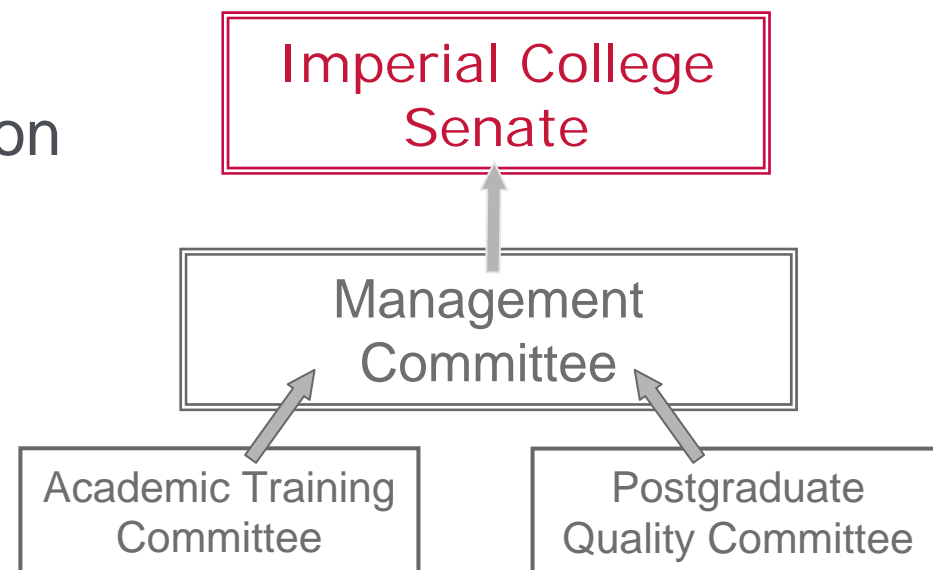- Quinquennial external review

An integrated voice

Integrated voice within the university

Directors of Graduate Schools have 'Head of department' equivalent status and are *ex officio* members of senior strategic university decision-making committees

Students representation on all Graduate School committees

Transferable skills

The Roberts Review 2002 'SET for Success'

Recommendation 4.2: PhD training elements

Despite the welcome current moves by the Funding Councils to improve the quality of PhD training, institutions are not adapting quickly enough to the needs of industry or the expectations of potential students. The Review therefore believes that the training elements of a PhD – particularly training in transferable skills – need to be strengthened considerably. In particular, the Review recommends that HEFCE and the Research Councils, as major funders of PhD students, should make all funding related to PhD students conditional on students' training meeting stringent minimum standards. These minimum standards should include the provision of at least two weeks' dedicated training a year, principally in transferable skills, for which additional funding should be provided and over which the student should be given some control. There should be no requirement on the student to choose training at their host institution. The minimum standards should also include the requirement that HEIs – and other organisations in which PhD students work – reward good supervision of PhD students, and ensure that these principles are reflected in their human resources strategies and staff appraisal processes.

Furthermore, in order to assure employers of the quality of PhD students, as part of these standards the Review recommends that institutions should introduce or tighten their procedures for the transfer of students to the PhD. In particular, the Review believes that HEIs must encourage PhD projects that test or develop the creativity prized by employers.

...the training elements of a PhD – particularly training in transferable skills – need to be strengthened considerably.

...include the provision of at least two weeks' dedicated training a year, principally in transferable skills,

Elements of doctoral training

Taught elements

Professional skills

Research element

Year 1	Year 2	Year 3

MPhil/PhD
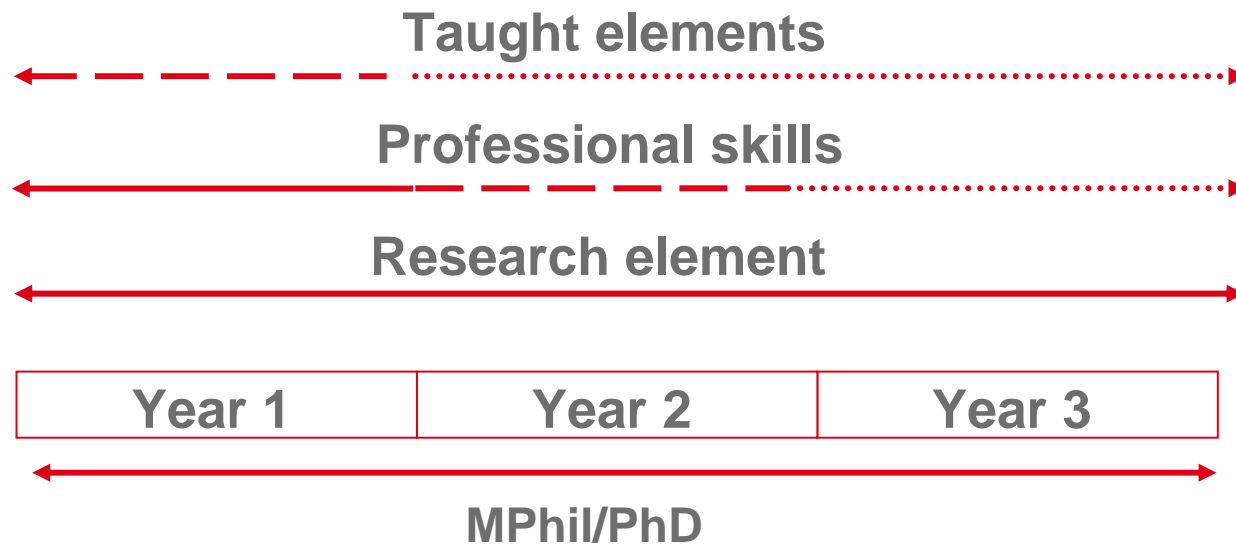
Taught elements = selected lectures, seminars

Professional elements = transferable skills development and training

Research element = PhD research project

Skills training – 8 major areas

Research skills and techniques*

Research environment*

Research management*

Personal effectiveness*

Communications skills*

Networking and team-working*

Career management*

Innovation and commercialisation

Intercultural and global skills

*UK Research Councils/UK GRAD Programme - Joint skills statement 2000

Transferable skills training – how?

Lectures

Training/discussion workshops (half to one day)

Residential workshops

Feedback:

- Residential

- Experiential not didactic

Some examples from our experience at Imperial…..

Training in transferable skills: e.g of workshops

Science, research and integrity

Time management and personal effectiveness

Communication and presentation skills

Networking; Negotiation skills

Teamwork

Writing skills

Science and the media

Intellectual property

Commercialisation of research

Thesis writing and completing the PhD

Career planning

Residential 3-day workshops for all students in their 1st and final year

Easthampstead Park, Berkshire:

- Space for team activities and informal interaction
- Distance from lab/department!

Year-1 course:

- Designed for students early in their research careers, with long term career effectiveness
- Ethos: enhancing personal and research skills

Final year course (FUMO):

- 'Finishing up and moving on'
- Career focus

Linked with more specialised training in Departments/Divisions

- Specialist oral presentations
- Preparing and presenting posters
- Preparing MSS for publication
- Writing grants
- Assessing manuscripts, publications and grants

- Day-to-day acquisition/absorption of skills
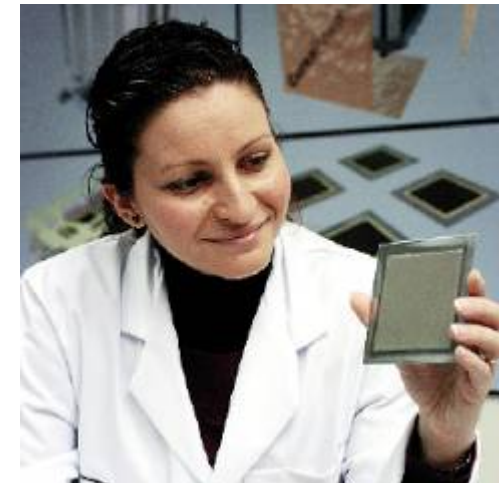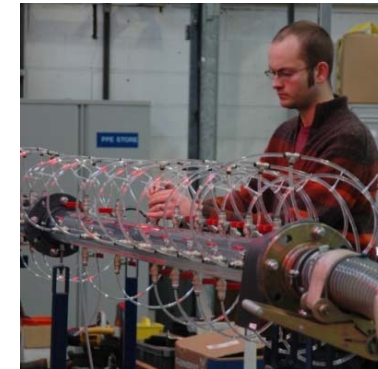
Who delivers this training?

A lot of work!

Internal professionals, within the Graduate School

- 2 Senior Lecturers in Transferable Skills
- 2 Trainers, e-technician, support staff

Science Communication Group, Humanities Department

Training the trainers

- Cohort of ~50 internal academic staff from all Faculties (Communications and presentation skills; Teamwork)
- Postdoctoral researchers, trained as tutors for the residential course

External professionals (very few)

What skills have our students acquired?

Research skills and techniques

Research environment

- Ethical issues - peer review, pressure for results, conflicts of interest, secrecy, obligation to the public
- Commercialisation

Research management

- Time management, prioritisation, realism
- Project management, milestones etc
- Data management, IT skills

What skills have our students acquired?

Personal effectiveness

- Self-discipline, motivation, initiative
- Awareness of self limitations, training needs

Communication skills

- Writing
- Oral presentations: brief, long
- Professional audiences, public understanding
- Teaching, media

What skills have our students acquired?

Networking and teamworking
- Within research group, institution, wider research community
- Understand behaviour, impact on others

Career management
- Ownership, realistic goals, identify development needs
- Insight into transferable nature of research skills, range of career opportunities within/outside academia
- Effective presentation - CVs, applications, interviews

The importance of transferable skills training

- Optimises the acquisition of research skills
- Facilitates career planning/design and continuing professional development
- Encourages flexibility for a changing labour market
- Gives postgraduates both personal and intellectual fulfilment
- Enhances the transfer of knowledge and skills
- By optimising the effectiveness of research training it contributes to the economic and social well-being of the nation

Times Higher Awards 2006
Outstanding Support for Early Careers Researchers

- Imperial's Graduate Schools won the Times Higher Awards 2006 in the category of Outstanding Support for Early Careers Researchers.

- More than 90 of the UK's universities took part

- The judges felt that

  - *'Imperial College has taken an innovative and integrated approach to supporting early-careers researchers.'*

Interdiscipinary environment

Interdiscipinary environment

Distinguished Guest lectures

Research students Summer Symposium

Workshops on hot topics

Debates

Graduate School Challenge (University Challenge)

Ig Nobel prize tour

All Graduate School events bring students together from across all
Faculties – combine academic with social events

Some of our distinguished guest lecturers

- Sir Paul Nurse
- Lord Bob May
- Professor Sydney Brenner
- Professor Richard Dawkins
- Professor Sir John Krebs
- Professor Julia Goodfellow
- Professor Jocelyn Bell-Burnell
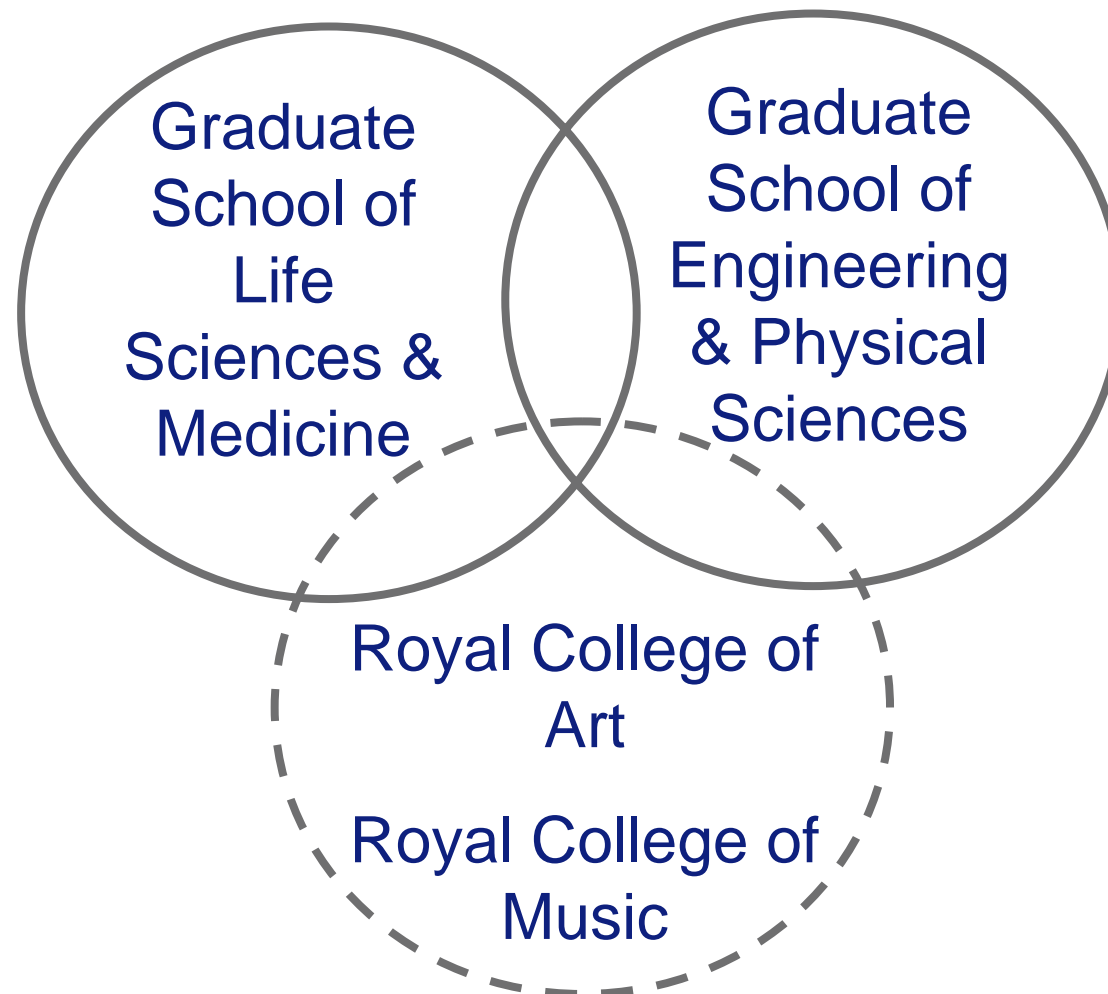- Professor Gordon Conway
- Professor Jared Diamond
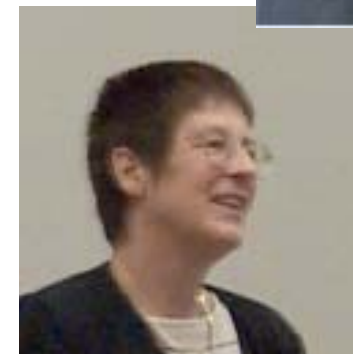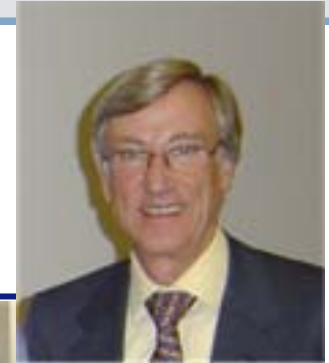
Students' Summer Symposium

- Introduction from the Rector
- Student research posters representing all departments
- Distinguished Guest Lecture
- Reception/celebration

Interdisciplinarity is an important part of skills training

Graduate School of Life Sciences & Medicine

Graduate School of Engineering & Physical Sciences

Royal College of Art

Royal College of Music

Intercultural experience is also increasingly important

IDEA League Summer School

Imperial, Delft, ETH Zurich, RWTH Aachen, ParisTech

July 2007

Research Development Skills

Intercultural 'discussion'

Do we need Graduate Schools?

Quality

- Completion rates improved
- Student satisfaction (ROLE)
- External review (Graduate Schools specifically complimented)

Integrated voice

- Student input e.g. minimum stipends

Transferable skills

- Excellent feedback
- Research – preliminary data suggest training is effective (with differences according to gender and country of origin)
- Requires longitudinal studies
- *Esat Alpay and Elaine Walsh. "A Skills Perception Inventory for Evaluating Postgraduate Transferable Skills Development", Assessment and Evaluation in Higher Education (2007), in press*

Interdisciplinarity/intercultural

- Excellent feedback

Do we need Graduate Schools? Yes!

Graduate Schools:

- Bring doctoral students and their studies into key position in the university (top management)

- Enable better link with research strategy and focus on research strengths

- Provide cohesive consistent approach

- Facilitate cross-faculty interdisciplinary activities

- Co-ordinate student input and involvement

- Enhance quality and effectiveness of research training

- Provide added value (compared to working via departments/faculties)
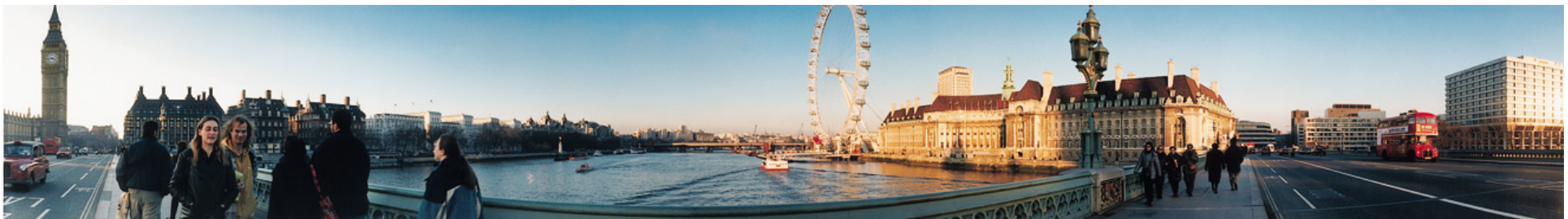
Graduate Schools: key factors

•Leadership and support from the top

•Clear decision-making structure that is fully integrated into the university

•Student representation

•Recognition of staff contributions (promotions etc)

•Excellent administrative support

•Ongoing discussion; no room for complacency

Thank you