

**TRINITY COLLEGE DUBLIN**

**SCHOOL OF NATURAL SCIENCES**

**MANUAL FOR BOTANY POSTGRADUATE  
RESEARCH STUDENTS  
2011-2012**



*Gentiana verna* L. by Ms. Holly Somerville

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<b>TABLE OF CONTENTS</b>	<b>PAGE</b>
Background and Introduction .....	3
Staff – How to contact us .....	4
Staff Research Interests .....	5
Getting Registered .....	6
Research Facilities and Equipment.....	6
Relationship between Supervisors and Students .....	7-8
Postgraduate Students Guidelines for Monitoring Progress.....	9-13
Discipline Rules and Regulations.....	14
Safety .....	15-18
Other Discipline Information .....	19-23
Funding Opportunities.....	24-25
Botanic Garden .....	26
Herbarium .....	27

### **University Calendar**

Full regulations concerning postgraduate study at Trinity College Dublin (TCD) are available in the Trinity College Calendar Part 2 (<http://www.tcd.ie/calendar/part2/>). Copies of the current regulations were presented to you at registration. Further copies, as well as copies of the current postgraduate prospectus, which contains useful information on the University, are obtainable from the Graduate Studies Office, Arts Building, College ([http://www.tcd.ie/Graduate\\_Studies/](http://www.tcd.ie/Graduate_Studies/)).

In the event of any conflict or inconsistency between the *General Regulations* published in the *University Calendar* and information contained in course/departmental handbooks, the provisions of the *General Regulations* will prevail.

## BACKGROUND & INTRODUCTION

Botany at Trinity College, as in most universities, began by giving 'service courses' to medical students; it was even prescribed by Act of Parliament that the Professor of Botany should give 'clinical lectures' in one of the hospitals. The first of the Professors to develop an independent interest in botany was Robert Scott who collected mosses and algae and wrote on the plants of Co. Fermanagh. The appointment of W.H. Harvey in 1844, first as Curator of the Herbarium and later (1856) as Professor, brought international renown to the Department from his work on seaweeds of the world, and on flowering plants of South Africa. In 1894, H.H. Dixon FRS initiated new research lines in cytology and plant physiology; he is still remembered in the latter field for giving the first convincing explanation of the forces that bring the sap from the roots to the top of tall trees in the theory of 'The Ascent of Sap'. In 1950, he was succeeded by D.A. Webb, who introduced ecology into the courses, wrote a pocket student flora for the identification of Irish plants and collaborated in the production of *Flora Europaea*, the first book to cover the flora of Europe as a whole. Meanwhile W.A. Watts, Professor of Botany from 1966 (later Provost 1981-1991) was unveiling the past vegetation of Ireland, Europe and North America by means of pollen-analysis. In 1980, D.H.S. Richardson, whose chief interests are in lichens and their use as indicators of air pollution, succeeded as Professor, a post he held until 1992. M.B. Jones was subsequently appointed to the Chair of Botany in 1996. In July 2005, the Botany Department became a Discipline within the School of Natural Sciences.

Associated with Botany is the Trinity College Botanic Garden<sup>1</sup> which is now at Trinity Hall, Dartry, about 4 km south of the College. It provides research facilities and plants for teaching. The 300th anniversary of the founding of the Botanic Garden at Trinity College was celebrated in 1987. The Department was instrumental in the formation of the Environmental Sciences Unit (1979), now the Centre for the Environment, and continues its strong link with Environmental Sciences.

Botany occupies the School of Botany building constructed in 1907 to a design supervised by Henry Dixon<sup>2</sup>. The architect was a Mr Marshall, of London, who was also responsible for the Cambridge Botany School. In 1910, a single story extension was added to the School of Botany to house the Herbarium<sup>3</sup>. Owing to pressure on space Botany has expanded in the last fifteen or so years and now occupies some of the ground floor of the Luce Hall and most of the adjacent prefabricated building. The School of Botany building has an eighty-seat lecture theatre which is used extensively by other parts of College.

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<sup>1</sup> Wyse Jackson, P.S. (1987). The Botanic Garden of Trinity College Dublin 1687-1987. *Botanical Journal of the Linnean Society*, 95: 301-311.

<sup>2</sup> Dixon, H.H. (1909). New School of Botany. *Notes from the Botanical School of Trinity College, Dublin*, 2: 1-4.

<sup>3</sup> See [www.tcd.ie/Botany/herbarium.html](http://www.tcd.ie/Botany/herbarium.html) for a complete account of the herbarium and a list of publications on its collections.

**STAFF – HOW TO CONTACT US****Teaching Staff**

Dr. Nick Gray (NG) <i>Professor of Environmental Sciences</i>	Centre for the Environment
Dr. Trevor Hodgkinson (TH) <i>Associate Professor of Botany</i>	First Floor, Botany Building
Dr. Daniel Kelly, Head of Discipline (DLK) <i>Associate Professor of Botany</i>	Ground Floor, Botany Building
Dr. Fraser Mitchell (FM) <i>Professor of Quaternary Ecology</i>	Ground Floor, Botany Building
Dr. John Parnell(JP) <i>Professor of Systematic Botany</i>	Ground Floor, Botany Building
Dr. Jane Stout (JS) <i>Associate Professor of Botany</i>	Ground Floor, Botany Building
Dr. Stephen Waldren (SW) <i>Associate Professor of Botany</i>	Trinity Botanic Gardens, Dartry & Centre for the Environment
Dr. Michael Williams (MW) <i>Assistant Professor of Botany</i>	First Floor, Botany Building

**Emeritus Staff**

Dr. Paul Dowding (PD) Fellow Emeritus <i>Associate Professor of Botany</i>	Botany Annex
Dr. David Jeffrey (DJ) Fellow Emeritus <i>Professor of Botany</i>	Botany Annex
Dr. Mike Jones (MJ) Fellow Emeritus <i>Professor of Botany</i> <sup>1</sup>	First Floor, Botany Building

<sup>1</sup>Holder of University Chair of Botany (1711)

**Technical Staff**

Ms. Siobhan McNamee, Acting Chief Technician	Ground Floor, Botany Building
Ms. Jacqueline Stone Murphy	Luce Hall
Ms. Patricia Coughlan	Luce Hall

**Executive Officer**

Ms. Sophia Ní Sheoin	Ground Floor, Botany Building
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## **Trinity College Botanical Garden Staff**

### **Ground Staff**

Ms. Elizabeth Bird  
Mr. Michael McCann

Botanic Garden, Dartry  
Botanic Garden, Dartry

### **Postdoctoral Fellows and Research Students**

The research effort of Botany involves a substantial number of postdoctoral fellows and research students.

### STAFF RESEARCH INTERESTS

Research falls into a number of research groupings which overlap and interact with each other. These groupings are in the ecology, physiology and systematics and conservation areas. Botany offers the opportunity to carry out research for M.Sc. and Ph.D. degrees. Intending research students should first discuss their research interests with the Head of Discipline or potential supervisor. The main areas of research interest of the academic staff are as follows:

Name and Degrees	Position	General Research Interests	Specific Research Interests
P. Dowding MA, Ph.D, FTCD, FRMet.Soc.	Fellow Emeritus	Aerobiology Ecology Mycology Micrometeorology	Pollen and spores in air. Microbial monitoring of air pollution. Decomposition. Nutrition of heterotrophic micro-organisms.
N.F. Gray BSc, MSc, Ph.D., Sc.D., FIBiol., FTCD	Professor Postgraduate Co-ordinator	Aquatic Science Microbial Ecology Pollution and its control	Carbon Assessment and Sustainability Freshwater Biology Pollution Ecology Water and Wastewater Treatment
T.R. Hodkinson B.Sc., M.Sc., Ph.D., FTCD	Associate professor	Plant Molecular Biology	Plant systematics and taxonomy. Plant genetic resources. Population genetics.
D.W. Jeffrey MA, Ph.D., FTCD	Fellow Emeritus	Ecology	Ecological soil plant relationships. Estuarine environmental research. Nature conservation management. Environmental education.
M.B. Jones BA, Ph.D, FTCD, MRIA	Fellow Emeritus	Plant Ecophysiology	Plant productivity. Photosynthetic performance of grasses and sedges. Plant biomass for energy. Consequences of climate change.
D.L. Kelly BA, DEA, Ph.D., FTCD	Associate Professor Head of Discipline	Plant Ecology	Forest vegetation. Flora of Ireland and the New World tropics. Bryophytes and epiphytes. Nature conservation.
F.J.G Mitchell B.Sc., Ph.D., FTCD	Professor	Quaternary Ecology	Palynology. Vegetation history and dynamics. Grazing ecology. Climate change impacts.
J.A.N. Parnell B.Sc., MA, Ph.D., FTCD	Professor Herbarium Curator	Plant Taxonomy	European and Thai floras. Biogeography. Pollination biology. Nature conservation.
J.C. Stout B.Sc, Ph.D.	Associate Professor	Ecology, Pollination	Pollinator behaviour. Plant breeding systems. Gene flow. Invasive species. Conservation.
S. Waldren B.Sc., Ph.D.	Associate Professor TCD Botanic Garden Curator / Administrator	Ecology Ecological Genetics	Conservation. Genetic variation. Island vegetation. Population differentiation.
M. Williams B.Sc., Ph.D.	Assistant Professor	Plant Cell Biology	Assimilate partitioning. Respiration of roots & shoots. Cell specialisation. Chloroplast symbiosis.

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## GETTING REGISTERED

In Botany, students normally have one supervisor but when it is desirable there may be joint supervision. After initial discussions with the potential supervisor, and when a suitable topic has been selected, the intending research student should complete an on-line application through [www.pac.ie](http://www.pac.ie). The online application fee is €45. This payment should be made online following the instructions on the website. Paying at a later date by bank draft costs €50. The online application processing fee is payable to PAC and is non-refundable. Further details can be accessed at: ([https://www.tcd.ie/Graduate\\_Studies/prospectivestudents/index.php](https://www.tcd.ie/Graduate_Studies/prospectivestudents/index.php)).

This application will be sent for approval to the Head of Discipline and, subsequently, to the Director of Teaching and Learning of the School of Natural Sciences for forwarding to the Dean of Graduate Studies. Following the Dean of Graduate Studies' approval, the student will be sent an official letter of offer and can register. There are two registration times each year. Every graduate student entering the graduate register for the first time on 1<sup>st</sup> September is required to attend for registration on a stated day, or days during September. A student entering the graduate register for the first time on 1<sup>st</sup> March should attend for registration in March and, where continuing registration is required, should re-register by the same date annually.

## RESEARCH FACILITIES AND EQUIPMENT

Botany is well equipped for research in several areas of plant biology. Extensive facilities for growing plants are available on campus in Botany (controlled environment chambers, greenhouses and tissue culture growth room) and at Trinity College Botanic Garden (laboratory, greenhouses, growth rooms, open-top chambers and outdoor experimental area). Equipment for studies of whole plant physiology includes laboratory and portable infra-red gas analysers, oxygen electrodes, porometer, leaf area meter, pressure chamber, psychrometers, chlorophyll fluorimeter and gaseous pollutant monitors (Ozone, and NO<sub>x</sub>) and eddy-covariance gas flux measurement system. Botany possesses automatically recording weather stations, a wide range of micrometeorological instruments and several data loggers. In addition, there are research microscopes (light and fluorescent).

For ecological and palynological research, field equipment includes corers, an inflatable boat for lake sampling and seven-seater van for transporting researchers.

A well equipped plant molecular biology laboratory with automatic sequencer and all normal ancillary facilities, including a plant DNA bank, has been established. There is close collaboration with other molecular biology laboratories in the TCD and elsewhere.

Analytical facilities in Botany include electrophoresis apparatus, gas chromatographs, a high pressure liquid chromatograph and an UV-spectrophotometer. We also have close links with both the Centre for the Environment and the Centre for Microscopy and Analysis, and use their facilities, including the two SEMs and TEM extensively.

The Trinity College Herbarium in Botany is the second largest in Ireland and is very well equipped. It contains some 275,000 specimens including Harvey's type collection of algae, an extensive collection of reference pollen from Europe and North America, large collections of European, African, Australian and Thai plants many of which have been recorded in an image archive. It is one of the richest herbaria, for its size, in terms of type material in the world and is used for research and teaching in taxonomy and ecology and is visited by taxonomists from many parts of the world.

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The Botany Discipline has two libraries – one general and the other associated with the herbarium. They contain extensive book collections and subscriptions to many relevant periodicals as well as periodicals obtained through exchange and deposited by the College Library.

Botany is also home to the Water Technology Research Group which is based in the Centre for the Environment.

## **RELATIONSHIP BETWEEN SUPERVISORS AND STUDENTS**

The relationship between supervisor and research student is a critical factor in determining the quality of the latter's postgraduate experience. Best practice leads to a relationship that may be described as mentoring on the part of the supervisor and learning on the part of the student. For a successful collaboration between student and supervisor, both parties have to recognise their own separate responsibilities. It is not possible to prescribe in detail the practices which supervisors and students should follow but certain general principles should be clearly understood by all involved in postgraduate education. These are set out below.

### **Responsibilities of the Supervisor**

A research student is accepted by the Dean of Graduate Studies on the recommendation of the Director of Postgraduate Teaching and Learning, the Head of Discipline and the designated supervisor. The supervisor has both a reactive and a proactive role. On the one hand, he or she must be reasonably accessible to the student for academic help and advice during the progress of the research and particularly during the preparation of the research thesis; on the other, he or she has a duty to be in touch with the progress of the research student's work and to inform the student of what is expected of him or her. In addition, the supervisor should help the student in the latter's dealings with College officialdom and should be aware of College regulations as they affect postgraduates.

### **Responsibilities of the Research Student**

During the initial weeks after first registration, a detailed research proposal should be prepared in consultation with the supervisor. The proposal should be planned on the basis that a Ph.D. should be completed within three years and an M.Sc. by thesis should be completed within two years. The proposal will form the basis of a seminar presented to all staff and students. Research students are expected to follow the postgraduate programme outlined below. At the end of their first year of registration students are required to produce a continuation report and a short progress report each subsequent year (see below).

### **Discipline Postgraduate Co-ordinator**

The Postgraduate Co-ordinator (PGC) is a member of the academic staff who has responsibility for postgraduate affairs in the Discipline. The Co-ordinator should be seen as a facilitator for issues facing postgraduates rather than an additional or substitute supervisor. The Co-ordinator will call meetings of the postgraduate body from time to time to discuss issues of common concern. The current Postgraduate Co-ordinator in Botany is Professor Nick Gray (nfgray@tcd.ie). He reports to the Director of Postgraduate Teaching and Learning (DTL), Professor Anna Davis (daviesa@tcd.ie).

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**Dean of Graduate Studies**

The ultimate responsibility for the welfare of postgraduate students in College lies with the Dean of Graduate Studies whose office also deals with questions of emergency financial assistance, thesis submission, travel grants, satisfactory progress and appeals. This office is located in the Arts Building. Research Students should contact the Discipline Postgraduate Co-ordinator in the first instance.



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## POSTGRADUATE STUDENTS GUIDELINES FOR MONITORING OF PROGRESS.

### Background

In order to support the development of research students and the collective research output of the Discipline, a series of definite milestones and deliverables have been identified.

#### **1. Getting established: research plan and oral presentation.**

Each new postgraduate is required to draw up a **research plan**, in consultation with his/her Supervisor. This should outline the scientific objectives of the research. It should include a summary of the pertinent literature, the hypotheses to be tested and the methods to be used. A timetable for the research should be drawn up, with a clear list of milestones and deliverables to be achieved over the first twelve months. If a collaborating institution is involved, a research panel will be set up which will include the supervisor and at least one member of the collaborating institution.

The research plan will form the basis of an **oral presentation** to be presented to the Department, as part of an informal seminar open to all staff and postgraduate students, within a period of a few months after registration. The oral presentation will last about 10-15 minutes, after which there will be open discussion of the project; feedback from those present will be encouraged. Within 3 weeks of this presentation, a revised research plan will be submitted to the Departmental Postgraduate Co-ordinator (PGC) who is currently Prof. Nick Gray (nfggray@tcd.ie).

#### **2. Confirmation on the Ph.D. Register**

Up to 2007 students were initially registered for an M.Sc. (Research) and then were required to transfer onto the PhD register on condition that satisfactory progress was achieved over their first year of registration. Since 2008 students have registered directly onto the PhD register but still need to be confirmed on the register subject to satisfactory progress over the first year. Full details are given in Section 2.13 Part 2 of the University Calendar which can be accessed online at: <http://www.tcd.ie/calendar/part2/>

Students must demonstrate their ability to independently carry out experimental and analytical work, and also to be able to analyze and interpret data at the required level. This is done by each student preparing a report as outlined below and a draft manuscript of a research paper to demonstrate their ability to carry out original work and disseminate it at the required level for publication in a refereed journal. Once the report has been submitted a Confirmation Interview will be held.

The **Confirmation Report** is of fundamental importance and continuation on the PhD register is neither automatic nor guaranteed, and is dependent on a reasonable level of achievement in the research student's first 12 months of research and that the work programme is sufficient to achieve the required level. Students should contact their supervisor about ten months after initial registration to discuss what is involved and how to proceed. The submission of the report is primarily the responsibility of the student not the supervisor. However, it is expected that supervisors will give guidance and comment on drafts. Reports must be completed

within 8 weeks of students registering for their second year. After submission, there is a formal interview.

### **2a. Purpose of the Confirmation**

- a) To confirm that the candidate is capable of fulfilling the requirements for a Ph.D. within the normal time period.
- b) To determine that a clearly defined strategy is in place to permit completion. This involves ensuring that:
  - i) a coherent plan for the completion of the Ph.D. has been agreed with the Supervisor;
  - ii) there are no insuperable barriers to the completion of necessary practical work;
  - iii) the time course suggested is appropriate;
  - iv) financial support issues are addressed.
- c) To ensure that a plan for publication of the research is in hand.

### **2b. Format of the Continuation Report**

The main body of the report must not exceed 12 pages (excluding references, draft paper and appendices) and should include the following:

1. A brief introduction including a short review of the literature (if not done elsewhere) followed by clear aims and objectives, including hypotheses where appropriate (2 pages).
2. A summary of the research conducted to date including brief methods, results and discussion (5 pages).
3. A summary of the work yet to be done (i.e. work plan) and a timescale for completion of the thesis (2 pages). A detailed Gantt chart must be included which should also include work done and in progress.
4. Thesis outline with list of chapters (1 page)
5. Outlines of proposed publications and conference presentations (1 page)
6. Details of how your research/timescale has deviated from the original plan (1 page)

Attached to the report (although not included in the page count) should be the following:

7. Reference list.
8. A manuscript written in the format of a named peer-reviewed journal to demonstrate the student's ability to analyze and interpret data. The paper may not be sufficiently developed for publication (i.e. due to limited data) but should demonstrate the student's ability to analyze and interpret data at the standard required for publication. This paper should be largely the work of the student with limited help from the supervisor.

9. Append any other publications (draft, submitted or accepted) or material which you think is relevant (e.g. data sets)

Three hard copies of the report must be submitted to the Botany Office within eight weeks of second registration.

### **2c. Approval of Confirmation Report**

An Interview will be arranged by the PGC to discuss the Report. The Panel for each student will consist of at least two members, drawn from those academic staff or members of a collaborating institution who are eligible to supervise research. One member will be the School's Director of Postgraduate Teaching and Learning (DTL) or his/her nominee from the academic staff of the School of Natural Sciences; a second member will have acknowledged expertise in the subject area of the student's research or in a cognate field and will be a member of the academic staff or of a collaborating institution. The Supervisor will not be a member of the Panel but it is expected that the Supervisor (and Co-supervisors, if any) will be present at the Interview, mainly in the capacity of observer and to clarify any issues that may arise.

The recommendations of the Panel will be one of the following: (a) continuation on the Ph.D. register; (b) continuation after minor changes have been made to the report; (c) continuation not recommended at this time; a new report to be submitted and a second interview to be held; (d) change to the M.Sc. register and submit an M.Sc. thesis; (e) not continue as a postgraduate student. If there appears a likelihood that the Panel's recommendation may be (d) or (e), the student shall be given prior warning to that effect. In all cases, written feedback will be given to the student as soon as possible after the Interview.

A student may appeal the result of the Interview. An intention to appeal must be made directly to the Head of School within 7 days.

Once the Report has been approved, the Form will be signed by the DTL and submitted to the Dean of Graduate Studies and the student record amended accordingly.

### **3. Annual reporting**

Each postgraduate will present an annual **College progress report**. (An annual report is commonly required by funding bodies in any case, though the amount of detail varies). The College report should revisit the list of milestones and deliverables drawn up twelve months previously, and report progress on each item. It should also comment on any significant problems encountered. The report should include a list of papers or posters presented at conferences, and an account of progress of submitted and in-draft publications. It should present a fresh list of milestones and deliverables for the succeeding twelve months, plus the necessary actions required to achieve them. An updated Gantt chart is also required. This is organized centrally by the School and students will be sent the relevant forms directly and must be satisfactorily completed before they will be allowed to re-register. The progress report should not exceed six pages and should be submitted in draft form to the Supervisor, at least one month before the annual deadline, for comment and signature. The revised

report must be submitted to the PGC within 12 months of the previous year's registration.

#### **4. Discussion of research in progress and communication of results**

Students are required to make presentations of their research in the course of its progress. These may take the form of informal, round-table presentations to a group; more formal seminars to the Department (or School); and oral or poster presentations at conferences. Currently, the Botany postgraduates organize a series of informal presentations of their research. All such presentations have the purpose of assisting students in developing both their research and their communication skills. They are also a means of introducing fresh research to an audience of scientific peers. In all cases, the audience is encouraged to provide feedback, in terms of suggestions, advice or information. Each student will make at least one oral presentation (or present at least one poster) in each academic year, either in TCD or at a conference such as IPSAM (Irish Plant Scientists' Association Meeting), ENVIRON (Environmental Sciences Association of Ireland annual meeting).

#### **5. Preparing and submitting publications**

Publication of research findings is a vital part of a research student's activities. Reporting of progress towards the production of publications is required in each annual report and in the Confirmation Report. In addition, it is required that, a draft manuscript be submitted as part of the Continuation Report.

#### **6. Preparations for submission of thesis**

Draft chapters of the thesis will be submitted to the Supervisor sufficiently early to allow adequate time for the Supervisor to read and comment, and for his/her comments to be taken on board (allow a minimum of three weeks for each chapter). A Supervisor may request to see a revised draft of a particular chapter; however, he/she is under no obligation to be involved in further revision of a draft, once read. Whilst it is a student's prerogative to decide when to submit the thesis, it is highly desirable that the supervisor is in a position to pronounce him/herself satisfied with the overall standard of the finished thesis before submission. It is important that the submitted thesis is well presented and carefully proof-read by the student.

For a summary of the standards expected of a Ph.D. thesis, see The University of Dublin Calendar 2011-2012 – Part 2, under section "The submission of theses and dissertations".

#### **Additional Training**

Research students are strongly recommended to take the Diploma in Statistics course run by the Discipline of Statistics. The course runs one evening a week for an academic year and successful candidates will receive a Diploma in Statistics.

It is recommended that this course is taken during the second year of the postgraduate research programme.

All postgraduate students are expected to attend the weekly Discipline seminars which take place from 2-4 pm on Fridays during Michaelmas and Hilary Term. Many of the

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seminars are given by invited speakers (from outside College) and offer an excellent opportunity to keep in touch with developments in the wider spheres of plant and environmental science.

### **Submission of Thesis**

Current regulations on the form of research theses and their submission should be obtained from the Graduate Studies website at:

[http://www.tcd.ie/Graduate\\_Studies/currentstudents/admin/thesisregs/index.php](http://www.tcd.ie/Graduate_Studies/currentstudents/admin/thesisregs/index.php) before starting to write.

The thesis will be examined *viva voce* by an external examiner. An internal examiner (who is not the supervisor) and independent chair is also present.

### **Travel Grants**

The Graduate Studies Office has limited funds available for travel and other costs associated with attendance at conferences and workshops. Funds are very limited and students not presenting their own work at a meeting may well remain unfunded.

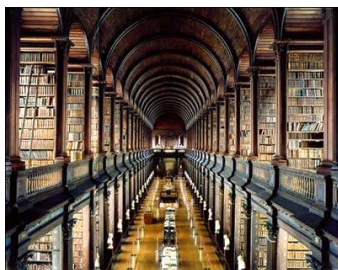
Applications must be made in advance on the prescribed form which is available at: [http://www.tcd.ie/Graduate\\_Studies/currentstudents/funding/travelgrants/index.php](http://www.tcd.ie/Graduate_Studies/currentstudents/funding/travelgrants/index.php).

### **Emergency Financial Assistance**

The Dean of Graduate Studies operates a scheme which provides emergency financial assistance for needy research students. Funds are limited and applications are assessed on the basis of full financial disclosures in an emergency.

### **Teaching/Demonstrating**

All research students are expected and required to undertake such teaching and demonstrating duties as are required of them in conforming with the expectations set out in the University Calendar.



## **DISCIPLINE RULES AND REGULATIONS**

### **Postgraduate representative**

The views and ideas of the research students are taken into account in the management of Botany. They should elect a representative at the start of each academic year who will attend the regular Discipline meetings and also act as an informal channel of communication with the Postgraduate Coordinator and Head of Discipline as necessary.

Agenda and Minutes of Discipline Meetings will be sent to the representative who may also initiate business.

The name of the representative should be given to the Head of Discipline at the beginning of each academic year.

Postgraduate students are also represented on other School Committees.

### **Training in Molecular Systematics for all New Laboratory Users**

It is mandatory for all new users of the molecular laboratory to undertake a period of training with Dr. Trevor Hodkinson prior to beginning their work so that molecular methods can be applied safely, successfully and without contaminating other peoples work. The training will run over several weeks beginning in October. Dates and times will vary, depending on the availability of the researchers attending the course. The course will introduce researchers to basic molecular skills such as DNA extractions and DNA purification, electrophoresis, PCR and various methods of data analysis. The first session will include a tour of the laboratory, the filling out of safety forms and a start on DNA extractions.



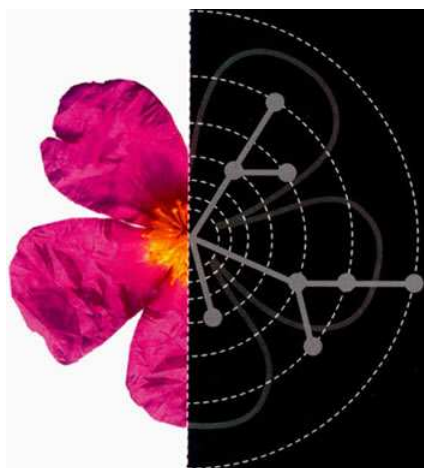
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## SAFETY

**All research students must comply with the following Safety and Security regulations.**

### **Legal Background**

The University must exercise a "duty of care" to employees and those they supervise. This duty of care is recognised in both criminal and civil law. There is also a duty on everybody to take reasonable care for their own safety and the safety of those around them.



### **THE LABORATORY**

In formal laboratory exercises you will be under supervision in a controlled environment where all reasonable safety precautions have been considered and all hazards identified. For that reason laboratory safety is reasonably taken care of provided you follow the instructions of those in control of the laboratory. However, you have a duty of care for yourselves and those who may be affected by your actions. This means that your behaviour in the laboratory must be such that you do nothing to place either yourself or other laboratory users at risk. There is only so much we can do and you have a legal obligation to follow instructions, look out for yourself and do nothing to put either yourself or others at risk.

Instrumentation in a laboratory is one area where this can be a problem. If you have never used an instrument before you will not know the potential danger it may pose. Do not interfere with any piece of equipment. You may muddle through with it but you might also cause injury to yourself or others. The staff, both academic and technical, along with more experienced fellow-postgraduates, are available to instruct you so always ask to be taken through the use and dangers of any piece of equipment which you have to use.

### **FIELDWORK**

Fieldwork is defined as any practical work carried out in the field by staff or students of the University for the purpose of teaching and/or research in places which are not under the control of the University, but where the University is responsible for the safety of its staff and students.

The following activities could be considered as examples of fieldwork from the Botany Discipline:

Soil and peat sampling, Vegetation surveying, Pollution studies, Water sampling, Meteorology, Plant collecting.

**Please Note that Voluntary and Leisure activities are excluded.**

Outside of Voluntary and Leisure activities, the Head of School has overall responsibility for health and safety in their School, which responsibility is, in part, devolved to the appropriate Head of Discipline. They are required to ensure that the risk assessment of

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the fieldwork is made and to ensure that a safe system of work has been established for all staff and students. This duty is frequently delegated to the member of staff organising the fieldwork. The Head of Discipline must ensure that the fieldwork meets the safety criteria of the Discipline, and that accidents are reported and investigated. There is a Discipline Safety Officer who is responsible for day to day safety matters.

There is a duty on the fieldwork participants to take reasonable care for their own safety and the safety of those affected by them.

Some staff and students may be unable to carry out certain types of fieldwork owing to various physical or medical conditions. Early identification of such problems is essential.

The School of Natural Sciences safety manual is accessible via the Botany web site. This document must be read by all postgraduates prior to conducting field or laboratory work. Safety forms for field and laboratory work are also available on the Botany safety web pages; these must be completed and signed by all students and their supervisors. The completed forms must be given to the Chief Technician prior to engaging in field and laboratory work. For more information, please see the following web page:  
<http://www.tcd.ie/Botany/postgraduate/current/>

Relevant and suitable protective equipment must be worn. Participants must dress appropriately especially in cold and wet conditions. When the activity involves the use of boats other than registered ferries appropriate life jackets must be worn.

## **FIRE**

### **Fire Prevention**

Copies of the College General Fire Notice are displayed in the Discipline. Familiarise yourself with the instructions in case of fire. Individuals are responsible for checking the fire precautions in their own work areas. Any defect or potential fire hazards should be reported to the Discipline Fire Warden or the Head of Discipline immediately.

Note the position of fire extinguishers in your working area. Familiarise yourself with the operating sequence for each extinguisher (but no testing please!).

Before leaving offices or laboratories:-

- ensure that all litter bins do not contain any smouldering materials.
- do not leave litterbins under or near to any combustible items e.g. desks, tables, shelving etc.
- close all filing cabinets and presses.
- switch off and unplug electrical equipment not in use.

### **In Case of Fire**

There is a fire alarm system in the Botany Building, and there is a fire alarm bell in the entrance lobby of the Luce Hall. If the alarm bells ring or someone shouts 'fire', all persons in the building *must* exit as rapidly as possible and assemble at the east end of the rugby pitch. The emergency exit from the lecture theatre is down the fire-escape ladder located outside window.

For emergency exit from the Luce Hall laboratories, unlock the exit doors using keys stored behind glass in a key box beside the doors.

At the assembly point organise yourselves into laboratory or functional groups and the senior person present must take a roll-call. Missing persons must be reported immediately so that a search can be instituted quickly.

**If possible, before exiting from the building, turn off all bunsens, electrical equipment etc.**

***CLOSE ALL WINDOWS AND DOORS IN YOUR LABORATORY AND IMMEDIATE WORK AREAS.***

If possible inform the *Front Gate Security Officer*, emergency no. ext: 1999 or the 24 hour security no. ext: 1317, who will call the fire brigade. Then inform the *Chief Steward*, ext: 1144. There is an emergency phone on the ground floor of the Botany Building for this purpose. Warn firemen of possible missing persons and potential hazards in the area of the fire – hazardous chemicals, pathogens, gas cylinders, etc.

### **BOMBS/HOAX BOMB CALLS/BOMB WARNINGS**

Keep an eye out for suspicious packages at all times. If one is observed report it to the Chief Technician or another staff member. If a bomb is thought to be in the building, procedures essentially follow those employed in the case of fire except that report is made to College authorities on ext: 1999/1317 (Front Gate Security Officer & 24 hour Security) who will call the Gardai.

### **FIRST AID**

First Aid boxes are placed in every laboratory. These boxes contain a range of dressings and bandages for treatment of minor cuts and burns. Placed on top of each box there should be an eye-wash bottle containing Optrex solution. ***DO NOT USE AN ITEM WITHOUT SUBSEQUENTLY INFORMING A TECHNICIAN.*** This ensures the incident is recorded and the items used are replaced. ***REPORT ANY DEFICIENCY OF THE ITEMS IN OR ON THE BOX TO THE CHIEF TECHNICIAN.***

All accidents *must* be reported to the Safety Officer (Ms. Siobhan McNamee) and entered in the accident book which is kept in the Chief Technician's office. An accident report form will be completed. Dangerous occurrences must also be reported on the appropriate form.

In the event of serious accident or medical emergency, quickly report it to the Chief Technician (Main Building) or the senior person present and call the Front Gate Security Officer ext:1999/1317 or call the *ambulance service* at no. 999 or 6778221 (Tara Street) if necessary. In the event of eye injuries, the victim should be taken *directly* to the Royal Victoria Eye & Ear Hospital, Adelaide Road. *During office hours medical assistance can be obtained from the Student Health Service* ext: 1556/1591.

In cases involving poisoning call the Poisons Information Centre, *Beaumont Hospital* no. 837 9964/ 837 9966 or contact the *Pharmacology Discipline* ext: 1563.

Familiarise yourself with the standard first aid procedures to be followed in the event of acid and alkali contact with the body, reagent ingestion, cuts, electrical shock, burns, etc. *Refer to the safety wall charts in the laboratories.*

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In the field, all staff and demonstrators carry an individual first aid kit. Discipline vehicles carry a more extensive kit. Report all field injuries or illness immediately to the leader of the field trip. You must always adhere to the instructions and directions of the field-leader.

Health and safety issues for laboratory and field projects must be discussed in detail with supervisors.

## SECURITY

### **Access to Botany Building**

The front door normally opens at 8.45 am each weekday. The front door will be, and must remain, locked between 1.00 p.m. and 2.00 p.m. and after 5.00 p.m. on weekdays and throughout weekends and holidays.

### **Other Areas: (Luce Hall, Hut)**

Keys and lock codes to these areas are issued as required by the Chief Technician.

### **General**

Undergraduates *must not* work on their own in the laboratories after normal working hours. The only exception is work on a final year project which must be approved by the supervisor and can only be carried out if another student is present.

Any door keys must be returned to the Chief Technician when you have ceased to be a student of the Discipline.

Bicycles are not allowed inside the Botany Building or Luce Hall.

### **Intruders/Thieves**

All College buildings are particularly vulnerable to intruders and potential thieves and as a result, cash, personal items and valuable equipment disappear without apparent explanation. You are advised *never* to leave a handbag, purse, wallet, calculator, camera, personal computer, *etc.* unattended in the laboratories or unlocked offices. The favourite times for thieves are at coffee and tea breaks.

You should challenge strangers you meet in the building. The simplest challenge is "May I help you?", or "Are you looking for someone?". If a person seems to be acting suspiciously, inform a member of staff or phone the *Security Office at Front Gate* (1317/1999) using the Emergency phone on the ground floor of the Botany Building or beside the Preparation room in the Luce Hall. You are asked to take the initiative to discourage intruders and thieves - do not assume that someone else will always do it. **Please note:** COLLEGE ACCEPTS NO RESPONSIBILITY FOR LOSS OF, OR DAMAGE TO, PERSONAL EFFECTS.



## **OTHER BOTANY (DISCIPLINE) INFORMATION**

### **Botany Office**

The Executive Officer is responsible for the management of the Botany Office. All queries regarding the Discipline are initially dealt with by the Executive Officer.

### **Acting Chief Technician's Office**

The Acting Chief Technician is directly responsible for all the services provided by the technical staff.

### **Please note:**

- (i) The day-to-day running of the stores is the responsibility of the Technicians. All orders sent to an outside firm or College Discipline must be on an official Discipline external order form and must be signed by the Chief Technician, Head of Discipline or Research Account Holder. No responsibility can be accepted for orders processed in any other manner.

Any experimental material in laboratories or greenhouses must be removed at the conclusion of the practical work. Consult your supervisor or a technician regarding dispersal.

- (ii) Photographic work will only be arranged by the technical staff.

- (iii) The Discipline photocopier is available *only* for the copying of articles in Library journals and books which cannot be removed from the building. The Discipline libraries are an extension of the College Library and therefore Copyright restrictions are identical. Cards may be purchased from technical staff at a cost of €10.00 for 200 copies.

## **INSTRUMENTATION**

### **New Users**

All new and potential users of equipment and instruments in the building must declare their intention of using such apparatus on the first occasion to the Chief Technician or a member of staff who will then arrange appropriate familiarisation briefings about the particular apparatus.

### **Booking of Instruments and Apparatus**

Booking calendars are supplied with some of the instruments in the building. *Irrespective of whether you actually require to advance book an instrument or not, you must sign on to show that you were a user of that particular instrument.*

### **Borrowing of Equipment**

The borrowing or use of Discipline equipment by outside persons must have the prior approval of the Chief Technician or Head of Discipline on each occasion of use.

**ALL EQUIPMENT AND INSTRUMENT FAULTS, DEFECTS, MISSING ITEMS, ETC. MUST BE REPORTED IN WRITING TO THE CHIEF TECHNICIAN WITHOUT DELAY.**

In the event of any conflict or inconsistency between the *General Regulations* published in the University Calendar and information contained in course/departmental handbooks, the provisions of the *General Regulations* will prevail.

### **Field Equipment**

Field equipment may be borrowed from the store but must be signed out and in. It is the responsibility of those who use field equipment to maintain it. Supervisors will be liable for the cost of repairs/replacement.

### **Use of Facilities in Other Disciplines**

Arrangements for using facilities outside the Discipline must be made through academic or technical staff. Local rules and regulations must be obeyed.

### **Greenhouses and Growth Cabinets, Laboratories and Herbarium**

Use of these facilities must be carefully scheduled well in advance. It is essential that experiments in these areas are well maintained and materials removed on termination. A high level of tidiness is expected of all users.

### **Discipline Vehicles**

The Botany discipline owns vehicles that are based both on campus and at the Botanic Gardens. The purpose of this document is to inform drivers of their responsibilities in using these vehicles.

Management: Overall management of the vehicles based on campus (currently: blue VW Vanette and grey Ford Transit) is the responsibility of the Acting Chief Technician, Siobhan McNamee. Overall management of the vehicle based in the Botanic Gardens (currently: white Citroen Beringo) is the responsibility of the Gardens Administrator, Steve Waldren.

Use restrictions: The vehicles can only be used for official College business. This precludes their use for society outings and social occasions.

Pre-requisites: All potential drivers must:

- a) hold a full EU or International driving license;
- b) have been driving on a full license for at least one year;
- c) complete the insurance declaration form;
- d) be given instruction on driving and parking the vehicles.

Steps a-d must be completed in consultation with the Chief Technician before first driving the vehicles. Failure to do so can invalidate the insurance.

Booking: The campus vans must be pre-booked by entering a booking in the van diary located in the kitchen in the Botany Building. The Gardens van may be booked by request made to the Gardens Administrator.

Pre-Driving Check: Prior to departure it is the responsibility of the driver to satisfy themselves that the vehicle is in a road-worthy condition. Particular attention should be paid to checking fuel, oil and coolant levels, the adequacy of the tyre pressure and tread and that the lights are functioning properly. As a courtesy, the driver should also check that their return time does not inconvenience the next driver.

Fuel: Both the blue VW Vanette and grey Ford Transit run on diesel. Fuel can be purchased using cash or the Topaz fuel card. A dedicated card must be used for each vehicle and each card has a unique PIN that has to be used when purchasing fuel. The relevant PIN is available from the Chief Technician on request.

In the event of any conflict or inconsistency between the *General Regulations* published in the University Calendar and information contained in course/departmental handbooks, the provisions of the *General Regulations* will prevail.

Accident/Breakdown/Damage: The driver must report all breakdowns and accidents as soon as possible to the Acting Chief Technician either directly by phone (01-8961309) or via the discipline office (01-8961274). In the case of an accident, the driver is responsible for ensuring that the reporting protocol required by the College insurance is adhered to. On return to College, the driver must also inform the Chief Technician, in writing, of any damage or breakdown.

From January 2010 the three Botany vehicles will be covered by an AA repair and recovery policy. A specific card and details of the policy are held in each vehicle. When assistance is required the driver will need to phone the AA and quote the policy number for the vehicle they were driving.

All drivers must be constantly aware of the dimensions of the vehicle they are driving. Most damage occurs when vehicles are being parked. Attention should also be paid to the height of the vehicle when entering car parks.

It is an essential requirement that all damage and breakdowns are reported to the Chief Technician in writing within 24 hours of return to College.

Tolls: It is the absolute responsibility of all drivers to pay road and bridge tolls. The bridge toll on the M50 is automatic (i.e. you don't hand over any money when you cross but you are charged). The toll can be paid after crossing the bridge in most petrol stations and in the TCD Student Union Shop. If the toll is ignored it will accumulate and eventually the driver will have to pay a considerably larger fee.

Returning the vehicle: On return to campus or Gardens the driver is responsible for ensuring that:

- a) the vehicle is parked legally in a designated parking space;
- b) the log book is fully completed (including charge codes);
- c) any damage or breakages are reported, in writing, to the Chief Technician;
- d) all samples and equipment are removed from the vehicle;
- e) all rubbish is removed from the vehicle;
- f) when necessary, the vehicle is cleaned both inside and out;
- g) all doors on the vehicle are locked;
- h) the key is returned promptly;
- i) a note is attached to the key indicating the location of the vehicle if it is parked in a remote part of the campus.

Parking on campus: It is essential that the vans are parked legally in a designated parking space and that they do not obstruct other vehicles. If there are no spaces available then it is possible to park the vans in the reserved area for College vehicles between the railway arches and the Lloyd building. To access this area you need to inform the security staff at Lincoln Gate to lift the barrier outside the Panoz institute. There is a second barrier outside the Hamilton building which security have to manually unlock to open so it would be a good idea to contact security on ext 1317 in advance. It is intended that this gate will be changed to an automatic locking system in the New Year. With this parking arrangement in place there can be no excuse for illegal parking. Please note that parking a van on the roadway outside the Botany building is not permitted.

**Charges:** A mileage rate will be used to charge for usage of the vehicles. This will be charged against research and course codes as appropriate. The rate is currently 63.0 cent per mile.

**Infringements:** If a driver fails to follow these instructions they will no longer be permitted to use the vehicles.

### **Mail and Telephones**

Mail for research students is delivered to the designated pigeon hole in the Botany Building. Official mail can be sent from the Discipline post box. College mail should not be used for external personal letters and parcels.

College internal telephone calls can be made from research laboratories. Research-related local telephone calls may be made from the research student room. Long-distance, research-related telephone calls can be made through the Discipline Office. Please give the telephone number to the Executive Officer and the connection will be directed to the research student laboratory.

Research related faxes can be sent using the Discipline cover sheet, available from the Discipline Office.

### **TCD Botanic Garden**

The day-to-day running of the Botany Garden is the responsibility of the Gardens Curator/Administrator, Dr. Steve Waldren. The Director of the Botanic Garden is Professor Mike Jones. Use of facilities at the Gardens (laboratories, growth rooms, greenhouses, gardens) should be discussed with your supervisor and cleared with Dr. Waldren.

### **Library**

The Botany Discipline Librarian is Dr. Nick Gray.

The Botany Discipline Library rules must be adhered to. They are as follows:

- (a) Books may be borrowed by:
  - (i) members of the College academic staff,
  - (ii) research students and technical staff in Botany,
  - (iii) sophister students attending Botany classes.

Other members of the College may read in the library but may *not* borrow books without the written permission of the Discipline librarian.

- (a) Periodicals *may not* be borrowed from the library by *anyone*.
- (b) Books on loan to the Discipline from the College library may not be borrowed, except by members of the academic staff, who may borrow them on the same terms as from the College library.

- (c) Books marked with a red seal and books on shelf K7, K8 and K 9 must not be borrowed by anyone.
- (d) Books borrowed must be entered in the loan book in an orderly and legible form.
- (e) No more than three books may be taken out on loan at one time.
- (f) Books borrowed must be returned within three weeks and may not be borrowed again by the same person until three days have elapsed since their return.
- (g) Books and periodicals should be returned to their correct shelf.
- (h) Books in the Herbarium Library may be borrowed at the discretion of the Herbarium Librarian (Dr. J. Parnell). Loans *must* be entered into the Herbarium library loan book.
- (i) Missing books or periodicals should be reported to the Librarian in writing.

PERSISTENT OFFENDERS AGAINST THE RULES WILL BE EXCLUDED FROM THE LIBRARY.

**Please Note:**

The Library is used for morning coffee (11.00 - 11.20 a.m.), lunch (1 - 2p.m.) and afternoon tea (4.00 - 4.20 p.m.) by the Botany Department staff and research students. It is also used occasionally outside these times for meetings.

**Computing Facilities**

Apple Macintosh and IBM compatible PCs are available to postgraduates in their workrooms.

Some of these machines are linked to the College network which gives access to a variety of facilities on campus and outside the University (*e.g.* Severs and the Internet). Access to these facilities can only be given by the Computer Laboratory and registration forms will require research supervisors signatures.

In addition, there are a number of University public access computer areas. These are very heavily used during teaching terms but are available for postgraduate use.

**Photocopying**

The Discipline copier may be used by research students. All copying is charged to research supervisors against their code numbers. Research students should obtain photocopy cards from the Acting Chief Technician.

## **FUNDING OPPORTUNITIES**

The Discipline makes a big effort to secure funding for all students offered places on the postgraduate research register. Funding is provided through external funding to supervisors, Trinity College awards, tutorial demonstration, and internal research studentships. In addition, the Discipline helps students apply for external postgraduate awards such as the Irish Council for Science, Engineering and Technology, and the Environmental Protection Agency scholarships. Intending applicants are advised to contact their prospective supervisor about the availability of funding opportunities.

### **Research Student Funding**

Work outside College is only feasible with supervisor's permission.

### **Trinity College Postgraduate Research Studentships**

A number of postgraduate awards are made annually to highly qualified candidates to enable them to undertake postgraduate studies in Trinity College. These are applied for by ticking the relevant box on the on-line application form. These studentships will cover fees (for recipients from EU and non-EU countries) and a maintenance award of €8,000 per annum (2011/2012 rates) for two years on the Masters register or three years on the Ph.D. register, subject to satisfactory progress. The studentship is a contribution towards maintenance, plus payment of the annual fee, less the acceptance deposit in the case of new entrants. New entrants must pay their own application and acceptance deposit fees. Recipients must engage in up to 6 hours unpaid teaching/demonstrating per week as a condition of the award. Subsequent teaching will be paid at the standard rate.

Normally, awards will be made only to applicants who were placed in the first class or the first division of the second class at a moderatorship or final examination or who obtained equivalent status at a final degree examination in a professional subject. However, graduates who are reading for the PhD degree may be eligible if they have already received a master's degree from the University, irrespective of the class of primary degree received, or who have been adjudged suitable for transfer to the PhD register.

Awards are tenable for one year in the first instance, but may be renewed on receipt of a satisfactory progress report submitted on a form issued by the Graduate Studies Office. Awards cannot continue beyond the second year on the Master's and the third year on the PhD register.

### **Trinity College Post-Graduate Ussher Fellowships**

These Fellowships aim to support and develop gifted research students. They are awarded competitively on academic merit. These highly prestigious studentships are open to graduates of any nationality for research in any branch of learning. These studentships will cover fees (for recipients from EU and non-EU countries) and a maintenance award of €16,000 per annum (2011/2012 rates) for the first two years on the Masters register and a further third year on the Ph.D. register, subject to satisfactory progress. Further guidelines can be found on the application form itself.

Further details of all Trinity College post-graduate funding may be found on the Graduate Studies Office web pages.

### **Local Authority Awards**

Students who received maintenance grants from their local authorities as undergraduates may be eligible for a continuation of the award as a postgraduate. Further information should be sought directly from the relevant local authority.

### **Irish Research Council for Science, Engineering and Technology Scholarship Scheme**

The Irish Council for Science, Engineering and Technology (IRCSET) offers scholarships through its Embark programme. The scholarship must be held at a recognised third-level institution in Ireland.

This scheme offers opportunities for suitably qualified (applicants must have a first or upper second class honours primary degree, or the equivalent) candidates who register to study towards a postgraduate degree in the broad areas of Science, Engineering and technology.

Under the Postgraduate Research Scholarship Scheme, funding of €24,000 is provided for each of three years for Doctorate level research (total funding of €72,000) and one year (€24,000) for Masters level research.

Scholarships will be awarded to those who are full-time students and who will engage full-time in research during the period of the Scholarship. The duration of the award will normally be three years for a PhD. Funding (or partial funding) but may be extended into a fourth year for a specific period of months. Any such extension will be subject to a separate application being made during the third year of registration for the PhD.

Funding for an M.Sc. by research) will be for one year with the option to continue to a PhD providing that the total funded period, including any extensions granted, does not exceed four years.

A formal call for submissions from interested students is advertised in national newspapers early in the new year and the funding starts in the following academic year.

### **Research Assistantships**

Postgraduate students may be employed as research assistants by their supervisor as part of an externally funded project. Availability of these positions is dictated by the supervisor's access to external research funds. Conditions of employment vary greatly between individual positions and therefore prospective candidates should seek advice directly from potential research supervisors.

### **Environmental Protection Agency**

Through its ERTDI programme, the EPA offers scholarships in the broad area of environmental research. A further call for projects may be announced in 2010/11.

### **Demonstrating**

Postgraduate students are paid at the rate of €23.35 per hour. Demonstrating to Freshman classes is allocated by the Director of the Biological Laboratory. Demonstrating to Sophister classes is allocated by course lecturers in consultation with the Discipline Postgraduate Co-ordinator. Claims should be made to the Discipline Executive.

### **Invigilation**

Invigilation is paid at the rate of €57.72 per 3 hour session and is allocated by the Examinations Office.

## **BOTANIC GARDENS**

### **Main Function of the Garden**

Support of botanical teaching and research with TCD by providing living plant material, controlled growth environments, glasshouses and other experimental facilities. The Garden also houses the Irish Rare and Threatened Plant Genebank.

### **Main Research of the Garden**

Conservation biology, taxonomy, physiological ecology, plant response to climate change.

The garden produces an Index Seminum for exchange with other gardens, arboreta and bona fide individuals every two years.

### **Facilities**

Four heated glasshouses, three unheated glasshouses, one poly-tunnel, walk-in controlled environment chambers, seed processing facility, deep-freeze seed genebank, low temperature growth facilities, experimental plots including open top chambers, growing beds including systematic garden and arboretum, potting shed and ancillary facilities. The diverse plant collection reflects teaching and research needs.

### **Director:**

Professor Mike Jones

### **Curator/Administrator:**

Dr Stephen Waldren

### **Ground Staff:**

Mr Michael McCann  
Ms Elizabeth Bird

For further information, please see the Botanic Gardens web pages at:

<http://www.tcd.ie/Botany/botanic-garden/>

## HERBARIUM

### Background

The Trinity College herbarium was established in 1840; its nucleus was the personal collection of Thomas Coulter, the first curator. However, the herbarium is really the creation of William Henry Harvey; curator from 1844 until his death in 1866. The herbarium has the biggest international collection in Ireland (including the oldest Irish material in existence, dating from 1722). It is particularly rich in material from South-east Asia (a focus of current research interest), Southern Africa, Australia, North and South America and Europe (another focus of current research interest), contains ca. 300,000 specimens, is of international importance, contains many type specimens and has a large, comprehensive, integral library. Currently, just under 2,000 specimens are added, through research activity, to the herbarium every year.

The Herbarium supports and is the core resource for much of the research and teaching in the Discipline. Its collections and library provide an unique reference source for identification of plant material. Many of its more important materials are being imaged.

Beyond the library and collections themselves the Herbarium's facilities include microscopes, computers with appropriate software for phylogenetic and phenetic analysis and a high quality imaging station and associated database (Penelope).

A guide to the layout of the Herbarium and list of the Journals in the Herbarium are available in the entrance to the Herbarium. An index to the Herbarium's book collection is available on a dedicated computer in the Herbarium. All these materials are also available from the MSc folder in John Parnell's GET folder (on the Meithal file server).

### Herbarium Curator:

Professor John Parnell

### Assistant Herbarium Curator:

Dr Trevor Hodkinson

### Curator of the Moss and Hepatic Collections:

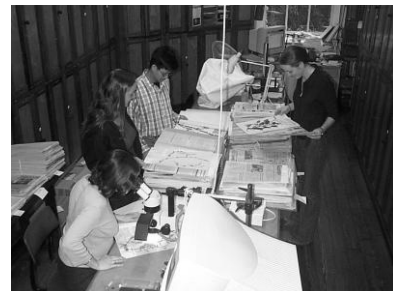
Dr Daniel Kelly

### Herbarium Assistant:

Ms Marcella Campbell

For further information, please see the Herbarium web pages at:

<http://www.tcd.ie/Botany/herbarium/>



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