## Post Specification

<table>
<thead>
<tr>
<th>Post Title:</th>
<th>Postdoctoral researcher</th>
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</thead>
<tbody>
<tr>
<td>Post Status:</td>
<td>Fixed-term Contract, (12 months)</td>
</tr>
<tr>
<td>Research Group</td>
<td>Plant Ecophysiology Research Group, Botany Department, School of Natural Sciences</td>
</tr>
<tr>
<td>/Department/School:</td>
<td></td>
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</tbody>
</table>
| Location:          | School of Natural Sciences  
|                    | Botany Department Building  
|                    | Trinity College Dublin, the University of Dublin  
|                    | College Green, Dublin 2, Ireland  |
| Salary:            | IUA Researcher Salary Scale 2017, Level 2, Point 1: €36,488 pro rata |
| Closing Date and Time: | 12 Noon on 9th February 2018 |
Post Summary
The Department of Botany at Trinity College, the University of Dublin is seeking a postdoctoral researcher to work with Dr Matthew Saunders on the EPA funded project SOLUM: Soil Organic carbon and Land Use Mapping. This position is a fixed term contract for 12 months. The successful applicant will be a core member of the SOLUM team and will contribute to the coordination of two Work Packages which will focus on the process based modelling of soil organic carbon and greenhouse gas emissions including associated uncertainty propagation from the site to national scale, as well as the development of a systems architecture to collate project outputs and make them available to the end-users. The successful candidate will be hosted in the School of Natural Sciences, Botany Discipline and will become a member of the Plant Ecophysiology Research Group.

General enquires regarding this post should be addressed to saundem@tcd.ie
Details on the application procedure can be found at the end of this document.

SOLUM project background
The impact of land use and land use change and forestry (LULUCF) on soil organic carbon (SOC) stocks and greenhouse gas (GHG) emissions is important both in terms of national GHG inventory reporting, and as a strategy to offset GHG emissions. Globally, the loss of soil organic carbon due to LULUCF has been estimated to be ~156 Pg of carbon to the atmosphere between 1850 and 2000, comprising 18% of global emissions (Houghton, 2003). This is mainly due to the conversion of forested areas to agriculture, and the conversion of grassland to cropland. Land use change can however, also enhance the carbon (C) sink strength of particular systems, due to increases in above and below ground biomass. Conversions from arable ecosystems to grasslands, as well as afforestation can lead to significant carbon sinks (Guo and Gifford, 2002). Additional to gross changes in land use, recent research has shown strong underlying patterns of agricultural land use change in Ireland (Zimmermann et al., 2016), with constant shifts between cropland and grassland. While, these short-
term changes may significantly influence SOC stocks and GHG emissions, there is a lack of information on the impact of these short term transitions. Conversely, grassland and arable management may offer significant potential to increase SOC stocks through optimal nutrient and tillage management and reductions in fallow periods (Soussana et al., 2004, Ceschia et al., 2010). Soil disturbance has been shown to trigger SOC loss due to the disruption of soil aggregates which protect SOC, and increased aeration which enhances mineralisation rates (Roberts and Chan, 1990). The carbon emissions and potential sequestration linked to LULUCF are acknowledged in the United Nations Framework Convention on Climate Change (UNFCCC) and need to be reported in national GHG budgets (Höhne et al., 2007; Schlamadinger et al., 2007).

Currently, LULUCF reporting for national inventory purposes relies on Tier 1 reporting methodologies (Duffy et al., 2015) with the main limiting factors being the lack of availability of soil property and agricultural activity data at an adequate spatial resolution. The recent development of new high resolution data products, including the Land Parcel Identification System (LPIS), and the Teagasc Soils Identification System (SIS) have the potential to address this knowledge gap, and, together with recent advances in earth observation sciences these data will provide a new foundation for the development of Tier 2 LULUCF GHG reporting methodologies in Ireland.

**Standard duties and Responsibilities of the Post**

The successful candidate will focus on the process based modelling of soil organic carbon, greenhouse gas emissions and associated uncertainty propagation, as well as the development of a systems architecture to collate project outputs and make them available to the end-users:

**The duties of the post will include:**

- The candidate will be expected to use the DayCent and ECOSSE models to assess impacts of land use and management changes on soil organic carbon stocks.
To investigate the role that agriculture plays in climate change and climate change mitigation.

The candidate will be expected to run regional to national scale simulations for soil organic carbon stocks.

The assessment of model sensitivity and uncertainty analysis.

Communicate the outputs of this work through scientific papers, technical reports, policy briefs, stakeholder meetings and key national and international conferences.

Participate in the wider research activities of the TCD Botany department and contribute to the academic mission of Trinity College Dublin.

Funding Information
The SOLUM project is funded by the Irish Environmental Protection Agency under the 2014-2020 Research Programme. The position will be filled on the IUA 2017 contract researchers salary scale, Level 2, Point 1: €36,488 pro rata.

Person Specification

Qualifications
- A PhD in biogeochemical modelling, soil science, environmental sciences, carbon/nitrogen/greenhouse gas dynamics, climate science, agronomy, geomicrobiology or related discipline is essential.

Knowledge & Experience (Essential & Desirable)
- Strong skills in using semi-empirical biogeochemical models (specifically DayCent and ECOSSE).
- A good understanding of farming practices in Europe, especially grasslands and croplands.
- Extensive skills in the use of GIS.
- Familiarity with programming/scripting (e.g. Python, R)
• Knowledge of the transformation and exchange processes of carbon, nitrogen and water within and between atmospheric, terrestrial and aquatic systems.

• Experience of measuring or modelling soil organic carbon stocks and/or soil derived greenhouse gas emissions.

• Ability to compile and interrogate large datasets.

Skills & Competencies

• Good organisational, communication skills and team working skills.

• High levels of initiative and self-motivation are essential.

• Experience of working within large research projects/programmes.

• Strong publication record and evidence of report writing.

• Evidence of scientific communication beyond standard academic outlets.

• Good scientific writing skills and command of the English language.

Discipline/Area Summary

The School of Natural Sciences

The School of Natural Sciences, comprising the Disciplines of Botany, Geography, Geology and Zoology, the Centre for the Environment and the TCBR, is one of the largest schools in the Faculty of Engineering, Mathematics and Science and hosts biological, physical and social scientists. The School currently accommodates 43 academic staff, 26 postdoctoral research fellows and over 150 postgraduate students (including 82 research and 71 taught students). Its taught programmes are varied as the School offers moderatorships (undergraduate degrees) in Earth Sciences, Environmental Sciences, Functional Biology, Geography, Geology, Plant Sciences and Zoology and contributes to other moderatorships including Neurosciences, Geography and Politics and to the Two Subject Moderatorship (TSM) programme (http://www.naturalscience.tcd.ie/undergraduate/). The School has also a major commitment to graduate teaching and supervision and currently hosts three taught Masters programmes (http://www.naturalscience.tcd.ie/postgraduate/).
Further Information for Candidates

<table>
<thead>
<tr>
<th>URL Link to</th>
<th>[<a href="http://www.naturalscience.tcd.ie/">http://www.naturalscience.tcd.ie/</a>](<a href="http://www.naturalscience.tcd.ie/">http://www.naturalscience.tcd.ie/</a>)</th>
</tr>
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<tbody>
<tr>
<td>School</td>
<td>URL Link to Research Group <a href="https://www.tcd.ie/Botany/staff/mattsanders.php">https://www.tcd.ie/Botany/staff/mattsanders.php</a></td>
</tr>
<tr>
<td>Human Resources</td>
<td><a href="https://www.tcd.ie/hr/">https://www.tcd.ie/hr/</a></td>
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**GARDA CLEARANCE:**

Police vetting will be sought in respect of individuals who come under consideration for a post.

PLEASE NOTE: Candidates will be required to complete and return a Garda Vetting form should they come under consideration for appointment. In some cases they may be requested to complete the form on the day of interview. This form will be forwarded to An Garda Síochána (Irish Police) for security checks on all Irish addresses at which they have resided. An Garda Síochána will make enquiries with the Police Service of Northern Ireland with respect to addresses in Northern Ireland. If a candidate is not successful in obtaining the post for whatever reason, this information will be destroyed. If a candidate, therefore, subsequently comes under consideration for another position, they will be required to supply this information again.

While candidates must complete information in relation to all addresses at which they have resided, the vetting is only done on addresses on the island of Ireland.

If a candidate has resided / studied in countries outside of Ireland for a period of 6 months or more, it is mandatory for them to furnish a Police Criminal Records...
Check/ Police Certificate from those countries stating that they have no convictions recorded against them while residing there. Candidates will need to provide a separate Police Criminal Records Check/ Police Certificate for each country in which they have resided. The Police Criminal Records Check/ Police Certificate must be dated after the date the candidate left the relevant country. Candidates should provide documentation in the English and/or Irish language. Translations must be provided by a registered translation company/institute in the Republic of Ireland; all costs will be borne by the candidate. Only original version documents will be accepted.

Candidates should be aware that any information obtained in the Garda Vetting process can be made available to the employing area.

It is the responsibility of the candidate to seek security clearances in a timely fashion as they can take some time. No candidate will be appointed without this information being provided and being in order.

The following websites may be of assistance in this regard:

www.disclosurescotland.co.uk
www.psni.police.uk
www.afp.gov.au
This website provides information on obtaining a national police clearance certificate for Australia
www.courts.govt.nz
This website provides information on obtaining police clearance in New Zealand.

For other countries not listed above candidates may find it helpful to contact the relevant embassies who could provide information on seeking Police Clearance. Original Police Clearance documentation should be forwarded to Human
Resources where it will be copied and the original returned to the candidate by post. Any cost incurred in this process will be borne by the Candidate

**Trinity College Dublin, the University of Dublin**

Founded in 1592, Trinity is at the nexus of tradition and innovation, offering undergraduate and postgraduate programmes across 24 schools and three faculties: arts, humanities, and social sciences; engineering, maths and science; and health sciences. Spread across 47 acres in Dublin’s city centre, Trinity’s 17,000-strong student body comes from all 32 counties of Ireland, and 16% of students come from outside the country. Of those, 40% are from outside the European Union, making Trinity’s campus cosmopolitan and bustling, with a focus on diversity.

As Ireland’s leading university, the pursuit of academic excellence through research and scholarship is at the heart of the Trinity education. Trinity is known for intellectual rigour, excellence, interdisciplinarity, and research-led teaching. Home to Nobel prize-winners such as scientist Ernest Walton and writer Samuel Beckett, Trinity draws visitors from across the world to its historic campus each year, including to the Book of Kells and Science Gallery which capture the university’s connection to both old and new.

Trinity accounts for one-fifth of all spin-out companies from Irish higher education institutions, helping to turn Ireland into an innovation-intensive, high-productivity economy. That culture of innovation and entrepreneurship is a defining characteristic of our campus as we help shape the next generation of job creators.

Trinity has developed significant strength in a broad range of research areas, including the 19 broadly based multi-disciplinary thematic research areas.
Ireland’s first purpose-built nanoscience research institute, CRANN, houses 150 scientists, technicians and graduate students in specialised laboratory facilities. Meanwhile, the state-of-the-art Biomedical Sciences Institute is carrying out breakthrough research in areas such as immunology, cancer and medical devices.

The Old Library, which houses the Long Room, in Trinity is the largest research library in Ireland, with a collection of six million printed items, 500,000 maps, 80,000 electronic journals, and 350,000 electronic books. Some of the world’s most famous scholars are graduates of Trinity, including writer Jonathan Swift, dramatist Oscar Wilde, philosopher George Berkeley, and political philosopher, and political theorist Edmund Burke. Three Trinity graduates have become Presidents of Ireland - Douglas Hyde, Mary Robinson and Mary McAleese.
Trinity is the highest ranked university in Ireland, and among the world’s leading higher education institutions.

**Trinity College Dublin World University Rankings**

**Overall**
- Trinity is Ireland’s No.1 University in the QS World University Ranking, THE World University Ranking and the Academic Ranking of World Universities (Shanghai).
- Trinity is ranked 71st in the World and 21st in Europe in the 2013/2014 QS World University Ranking across all indicators.

**Internationalisation**
- Trinity is ranked 44th in the World in the Times Higher Education Top 100 Most International Universities.
- Trinity is 46th in the World in the QS World University Ranking 2013/2014 in terms of International Faculty.

**Research Performance**
- Trinity is ranked in the top 70 universities in the world in the Times Higher Education Ranking of World Universities in terms of overall research and in the top 75 universities in the world in terms of citations (research impact).
- Trinity ranks in the top 1% of research institutions in the world in the following 17 Essential Science Indicators fields (an increase of over 150% from 2004): Physics, Chemistry, Engineering, Social Sciences (General), Immunology, Neurosciences, Nanosciences, Materials Science, Pharmacy and Toxicology, Molecular Biology and Genetics, Biology and Biochemistry, Microbiology, Plant and Animal Science, Clinical Medicine, Agriculture, Psychiatry/Psychology, Environment/Ecology.
In the QS Faculty Rankings 2015*:

- Trinity is ranked 63rd in the world in Arts and Humanities.
- Trinity is ranked 69th in the world in Life Sciences and Medicine.
- Trinity is ranked 89th in the world in Social Sciences and Management.

In the QS Subject Rankings 2015**:

Trinity College Dublin features in the world's elite (Top 200) institutions in 25 of the 28 subjects in which it was evaluated by the QS World University Rankings by Subject 2015. Of these, Trinity ranks in the top 100 in the world in 14 subjects and in the top 5 in the world in 5 subjects.

Top 50

- Trinity is ranked 32nd in the world in English Language and Literature.
- Trinity is ranked 33rd in the world in Politics and International Studies.
- Trinity is ranked 39th in the world in History.
- Trinity is ranked 48th in the world in Biological Sciences.
- Trinity is ranked 49th in the world in Modern Languages.

Top 100

- Trinity is in the top 100 in the world in Chemistry.
- Trinity is in the top 100 in the world in Computer Science and Information Systems.
- Trinity is in the top 100 in the world in Education.
- Trinity is in the top 100 in the world in Geography.
- Trinity is in the top 100 in the world in Law.
- Trinity is in the top 100 in the world in Medicine.
- Trinity is in the top 100 in the world in Pharmacy and Pharmacology.
- Trinity is in the top 100 in the world in Philosophy.
Trinity is in the top 100 in the world in Psychology.

**Trinity subjects ranked in the world top 101-200 (QS Subject Ranking 2015)**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Trinity Rank</th>
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<tbody>
<tr>
<td>Accounting and Finance</td>
<td>101-150</td>
</tr>
<tr>
<td>Business and Management Studies</td>
<td>101-150</td>
</tr>
<tr>
<td>Economics and Econometrics</td>
<td>101-150</td>
</tr>
<tr>
<td>Linguistics</td>
<td>101-150</td>
</tr>
<tr>
<td>Physics and Astronomy</td>
<td>101-150</td>
</tr>
<tr>
<td>Sociology</td>
<td>101-150</td>
</tr>
<tr>
<td>Engineering - Civil and Structural</td>
<td>151-200</td>
</tr>
<tr>
<td>Engineering – Electrical</td>
<td>151-200</td>
</tr>
<tr>
<td>Engineering – Mechanical</td>
<td>151-200</td>
</tr>
<tr>
<td>Environmental Sciences</td>
<td>151-200</td>
</tr>
<tr>
<td>Mathematics</td>
<td>151-200</td>
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</tbody>
</table>

* QS ‘Faculty’ Rankings 2015: [www.topuniversities.com/faculty-rankings](http://www.topuniversities.com/faculty-rankings)

** QS Subject Rankings 2015: [www.topuniversities.com/subject-rankings](http://www.topuniversities.com/subject-rankings)

**Pension Entitlements**

This is a pensionable position and the provisions of the Public Service Superannuation (Miscellaneous Provisions) Act 2004 will apply in relation to retirement age for pension purposes. Details of the relevant Pension Scheme will be provided to the successful applicant.

Applicants should note that they will be required to complete a Pre-Employment Declaration to confirm whether or not they have previously availed of an Irish Public Service Scheme of incentivised early retirement or enhanced redundancy payment.
Applicants will also be required to declare any entitlements to a Public Service pension benefit (in payment or preserved) from any other Irish Public Service employment.

Applicants formerly employed by the Irish Public Service that may previously have availed of an Irish Public Service Scheme of Incentivised early retirement or enhanced redundancy payment should ensure that they are not precluded from re-engagement in the Irish Public Service under the terms of such Schemes. Such queries should be directed to an applicant’s former Irish Public Service Employer in the first instance.

**Employment Permit Eligibility Criteria**

Applications from non-EEA citizens are welcomed. However, eligibility is determined under the relevant regulations of the Department of Jobs, Enterprise and Innovation. Trinity, as an accredited research organisation, can form Hosting Agreements with third country nationals (Non-EEA nationals) for the purposes of conducting research in the University. Non-EEA candidates should note that the onus is on them to secure a visa to travel to Ireland prior to interview. Non-EEA candidates should also be aware that even if successful at interview, an appointment to the post is contingent on the securing of a Hosting Agreement or Employment Permit as appropriate. See [https://www.djei.ie/en/What-We-Do/Research-Innovation/Hosting-Agreement-Scheme/](https://www.djei.ie/en/What-We-Do/Research-Innovation/Hosting-Agreement-Scheme/)

**Equal Opportunities Policy**

Trinity College is an equal opportunities employer and is committed to employment policies, procedures and practices which do not discriminate on grounds such as gender, civil status, family status, age, disability, race,
religious belief, sexual orientation or membership of the travelling community.

On that basis we encourage and welcome talented people from all backgrounds to join our staff community.

Trinity College’s Diversity Statement can be viewed in full at https://www.tcd.ie/diversity-inclusion/diversity-statement

Application Procedure

Candidates should submit a cover letter together with a full curriculum vitae to include the names and contact details of 3 referees (email addresses if possible) to:

Name: Dr Matthew Saunders
Title: Assistant Professor in Plant Sciences
Email Address: saundem@tcd.ie
Contact Telephone Number: +353 (0)1 8964870