**Research Proposal**

**PhD/Masters/Honours**

|  |  |
| --- | --- |
|  | |
| Faculty: | **Environment, Society and Design** |
|  | |
| Department/School: |  |
|  | |
| Degree: | **B.Science(Honours)** |
|  | |

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| --- | --- |
|  | |
| Student Name: | **Richard (Rikki) Andrew Cattermole** |
|  | |
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|  | |
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| Email Address: | **alphaglosined@gmail.com** |
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|  | | |
| Proposed Thesis or Dissertation Title: | Web routers: An explorative performance review | |
|  | | |
| Brief Description of Research: |  | |
|  |  | |
| Due Date for Thesis or Dissertation Submission: | |  |
|  | | |

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# Proposal Checklist

*Copy (Ctrl+C) this ticked box*  *then highlight an answer box, and Paste (Ctrl+V) the ticked box in place of the answer box.* ***Sign and date using a pen.***

|  |  |
| --- | --- |
| 1. I have taken part in a Mutual Expectation Agreement (MEA) meeting with my supervisory team.   Date of meeting: |  Yes  / / |
| 1. I have given a seminar on my research proposal.   Date of seminar: |  Yes  No  / / |
| 1. I have booked (or completed) training in how to use the Endnote bibliography software. |  Yes  No |
| 1. I agree to consult with and obtain approval from the Human Ethics Committee BEFORE starting any empirical, lab, practical or field work, and I will comply with the conditions specified in the approval. |  Yes  NA |

**Student**  **Supervisor**

**Signature:**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Signature:\_\_\_\_\_\_\_\_\_\_\_** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Date Proposal  
Submitted:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Date:**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Supervisor Team Details

**Main Supervisor:**

|  |  |
| --- | --- |
| **Status:** |  |
|  | (Supervisor, Co-Supervisor) |
| Name: |  |
| Position Held: |  |
| Email Address: |  |

**Other Supervisors:**

|  |  |
| --- | --- |
| **Status:** |  |
|  | (Associate Supervisor, Co-Supervisor) |
| Name: |  |
| Position Held: |  |
| Email Address: |  |
| Company & Postal Address (if External): |  |
|  |  |
| **Status:** |  |
|  | (Associate Supervisor, Associate Co-Supervisor, Advisor) |
| Name: |  |
| Position Held: |  |
| Email Address: |  |
| Company & Postal Address (if External): |  |
|  |  |
| **Status:** |  |
|  | (Associate Co-Supervisor, Advisor) |
| Name: |  |
| Position Held: |  |
| Email Address: |  |
| Company & Postal Address (if External): |  |

# Main Supervisor Approval

*I confirm the following:*

|  |  |
| --- | --- |
| 1. A full cost budget (itemised and listed by calendar year) has been prepared for this research project and is attached. I have examined the budget, and it appears to be suitable. |  Yes |
| 1. Equipment or facilities required for completion of the project are available or can be obtained (within contraints applying to purchase of capital equipment) using the project funding applied for or contracted. |  Yes  No   NA |
| 1. The outcome of this research project could produce commercialisable Intellectual Property (protectable by patent or not).   If YES, I have advised the Director of the Research & Commercialisation Office in writing (email), so that the Director can consider what further documentation may be necessary. |  Yes  No  Unsure   Yes |
| 1. I approve this proposal with the following comment: | |

Main Supervisor Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Further Approvals for this Proposal

**Other Supervisors:**

|  |
| --- |
| I \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, approve this proposal with the following comment:  Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
|  |
| I \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, approve this proposal with the following comment:  Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
|  |
| I \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, approve this proposal with the following comment:  Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
|  |

**Postgrad Convenor of Department/School:**

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| --- |
|  |
| I \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, approve this proposal with the following comment:  Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
|  |

**Faculty Postgrad Convenor:**

|  |
| --- |
|  |
| I \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, approve this proposal with the following comment:  Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
|  |

# Web routers: An explorative performance review

# Introduction

Web routers are the core technology that allow for execution of code in response to requests by a Hyper Text Transfer Protocol (HTTP) client. A web router is not interacted with directly by a user, instead it is configured by descriptions of websites or by some form of framework. Web applications or web services as they are more commonly known by are what developers implement to produce dynamic content for a website. Dynamic content as well as unchanging static content, utilize a router to locate the resource handling mechanism to execute to produce a response to the HTTP request.

HTTP is not the only technology used commonly in this process. Hypertext Markup Language (HTML), Javascript and Cascading Style Sheets (CSS) are also used as a rendering specification for the client. To interact with the HTTP request/response cycle occurs to retrieve resources from the server to display in some form.

The client side technologies is an ever changing landscape; the focus of this research is into the web router that processes these requests that are already gathered by a server. There was little discovered research done into the web router as part of this work, for this reason the performance costs involved in a web router need to be investigated into how much an implementation actually matters.

The main set of technologies used in websites are: a client, server and possibly many web applications. The client interacts with the user in some form, most often the usage of a web browser is the preferred client. A web application is a separate program running in parallel to the web server. It could be a blog or a script doing administrative tasks on command. The web server creates an instance of a web application to connect to it and by doing this, integrating its routes and processes into itself.

## Example of a Second-Level Heading

A second-level heading uses the style ‘Heading 2’. To create your own second-level heading, type in the heading, highlight it, and press Ctrl+Alt+2.

# Literature Review

The World Wide Web was conceptualised in 1989 (World Wide Web Consortium, n.d.) since then there has been a large uptake in its usage by everyone all across the globe to an estimate of 3.4 billion users as of October 8th of 2016 (Internet Live Stats, 2016). With every one of those users working with the standards of Uniform Remote Locator[[1]](#footnote-2), Hypertext Transfer protocol[[2]](#footnote-3) and Hypertext Markup Language[[3]](#footnote-4) in some form or another.

During the early days many different web browsers and servers were created. Majority of these have since long died off but the legacy that is the definition of each has not. As defined by the World Wide Web Consortium (W3C) (World Wide Web Consortium, 2014):

1. Web browser  
   A program which allows the display and execution of a web page for a user. Interacts with a web server to provide any data required. This is the most common form of client.
2. Web server  
   Retrieves files or resources from the file system or some form of backend such as a web application and sends them to the client as requested.
3. Web Server API or service  
   A standalone piece of software that will dynamically create content to send to a client. It communicates in some form to the web server to serve up content to the client.



Figure 1The web (HTTP) request + response cycle

With an upsurge in internet speeds during 1990s as demonstrated by Nielsen’s Law (Nielsen, 1998), companies and developers alike experimented with dynamic web pages allowing for user interactions not possible with static web pages alone. The Common Gateway Interface[[4]](#footnote-5) was created to allow for external program to be executed as part as the web page processing by a server. From this point on existing programming languages gained uses that was not seen before which helped to introduce other new programming languages. An example of a new programming language spawned by this would be PHP (The PHP Group) which has the primary purpose of dynamic page creation on each request by the client.

Web servers and web (server side) APIs alike are a field of research that continues to introduce new areas of study for research in both a formal and an informal capacity. Combined they share a very similar technology set, with only slightly different purposes and entry points. Of which the web router that resides on a server from which all fundamental mental models originate is conceived.



Figure 2 General HTTP request + response processing activites

A web router, primary goal is to map any incoming request from a socket to a function process it. The execution and processing of a request once mapped can be done in any number of languages and quite commonly utilities other protocols such as a Fast-CGI to communicate to another process to execute the request. This is shown in Figure 2 is based upon HTTP 1.x diagram.

The tendency of web developers is to focus upon coding within the requests and manipulating of the response for the client side. For the server side the focus is upon handling the routes for a given purpose. When it comes to implementation of the libraries, frameworks and end user code there is little consideration by those who use a specific implementation and along with it, its performance. This can cause problems such as the time it takes to handle a request from getting it to responding to it back the client. These existing algorithms and data structures were created for the usage within a database engine. In the context of a database they have been optimized and analyzed for best performance. For a web server these algorithms and data structures may have improved performance once they have been analyzed with optimizations for this use case.

## The request-response cycle

At the core of a web router is the process of turning an HTTP request into a call to a procedure to handle the request and return the result along with some meta information (e.g. how long to cache it for). This process has several stages:

1. Socket listening & connection
2. HTTP request received
3. Routing to function call & execution of function
4. HTTP response creation
5. Response sending

The above list is a general overview of the different sequential parts that a request goes through on the server. Commonly it is implemented as:

1. Asynchronous socket listener
2. Thread/Fiber router (choose the thread to execute the request handling in)
3. HTTP request processing
4. Routing to function call
5. HTTP response creation and return

This overview does not take into account some of the problems faced by all implementations. Not all information that is required to complete a request is held within memory while the program is executing. Instead it relies upon other software (e.g. a database) to hold it. The process to communicate and retrieve this extra information is expensive compared to the time it would have been if it was in memory at the time of request. The usage of external resources is commonly implemented using blocking operations. A good example of this is file reading and writing which is critical to web servers if they serve content held within the file system. Blocking operations prevent other requests from being concurrently served.

Asynchronous execution of requests is a complex topic that can affect performance between web servers quite significantly. The difference is exemplified by Nginx and Apache2 httpd. Nginx uses asynchronous event based handling, while Apache2 utilizes a thread based approach (DigitalOcean, 2015).

When a connection has been established and the handling code is executed, it will translate the given binary stream into some form of programmatic representation such as classes or structs. Allowing for ease of use and modification by the routing engine. The handling code may be a wrapper to another protocol such as Fast-CGI to allow out of process execution and processing of the request.

The routing engine is responsible for manipulating this request representation into recognizing a specific route. This is primarily done by utilizing some kind of run-time look up and registration into the routing table. This allows for using language features such as attributes to map procedures to routes more organically. For example, the web server Nginx, utilizes Red-Black trees for files caches[[5]](#footnote-6) and Fast-CGI[[6]](#footnote-7) processing. From this the handling mechanism for the specific route is called with it.

## Current routing approaches

By using the definition of a router as the process to which the decision of which route handler is chosen per request and along with it the definition of what the route is. The approaches that are available to implement the routing can differ quite significantly in there behaviors. These different approaches each have a different set of costs and cannot be interchanged in a given context with the expectation of performance related changes occurring.

There is a variety of different methods used in implementing a web router. Common ones include: tree graphs such as a Red-Black tree graph or using a single Regular Expression (regex). A single regex can simplify the code required but will result in a limited capability. With only the host name and URI path being validated against.

TODO: needs references, Nginx for RB-Tree, PHP reference for regex expressions in a router

At the core of what a web router does is to take a set of known variables and return a function to execute with the potential to modify the known variables. These set of variables that must be utilized in each searching of the underlying structure are unique when compared with existing research into data structures which focuses primarily upon a single variable. The extension to multiple variables to check and a more complex search algorithm that may need to repeat itself mean existing data structures and algorithms may be used but modified to take into account that simple comparisons do not correctly relate entries to the search parameters.

Current implementations typically use with the path from the HTTP header to perform lookups. These require the least extension to existing data structures and algorithms. Regular expressions are typically used to implement them. These cover most cases; by utilizing multiple instances of the router implementation it can be used for different HTTP methods such as GET and POST without direct support within the elements of the data structure.

Some servers support a feature known as rewriting. Rewriting is the process by which requests are modified into being another; however only internally. After a ‘rewrite’ of a request takes place it must be evaluated out as if it was a new request. Most web routers do not implement this feature because of its complex nature. The rules by which it can modify the request by can include the path, domain, time stamp, client IP address and any other HTTP request field.

In non-regex approaches, more information is stored using data structures. Such as a key in a map or to wrap the reference to the handler function. This allows the routing algorithm to use other conditions such as the HTTP request fields of User-Agent, Referer or Host. Support of this is a significant complexity increase and limited research into this area was discovered in the creation of this proposal.

The implementation of the storage mechanism that the web router utilizes can take many forms including a list or a tree graph. These data structures are fairly simple in design but have many optimization opportunities such as cache locality for children in a tree graph which can improve performance by many magnitudes (Ross & Rao, 2000).

# Research Objectives/Questions

# Methods

Replace these notes with your own words.

This section should be no longer than ten pages.

The paragraphs use the ‘Body Text’ style (Alt+B).

# Timetable

# Health and Safety

# Budget

See the guidelines at the end of this document for details.

# References

Use Endnote to format your bibliography. You should attend a training session in using Endnote, run by the Library.

# APPENDIX: Funding

*NOTE: This section is for your information only and should be deleted from the proposal document before you submit it for approval (but saved elsewhere for your ongoing reference).*

## 

## 1. Policy

The Faculty of Environment, Society and Design provides funds to *subsidise* the thesis research of Masters and PhD students through an allocation from Lincoln University. These research funds are allocated to support students’ efforts to produce quality research of a publishable standard. Honours and Masters dissertations are also funded by the Faculty.

Quality research does not necessarily equate to expensive research. The Faculty therefore encourages students to use research methods that make efficient use of research funds. Students’ requests for funding must be reasonable in terms of the nature of the budget items requested, and budget requests must be clearly aligned with the purpose of the research.

Students are encouraged to seek funds or sponsorship from relevant external agencies as linkages with such organisations may one day translate to employment or further research opportunities.

Allocated funds may not be accessed until the Faculty of Environment, Society and Design and the University Human Ethics Committee (if necessary) have both approved the proposal.

Students may access up to $100 of their funds for preparation of their proposal. In rare circumstances, a student may apply for additional pre-proposal funding.

Supervisors are responsible for student spending and must sign all claim forms. The student should maintain a list of expenditures.

If there are significant changes to the content or the procedures outlined in the proposal, students must inform the Faculty Postgraduate Administrator of such changes after discussion with their supervisors.

## 2. Guidelines

The research funds are allocated for expenses associated with data collection and analysis, broadly defined. Listed below are items that are generally *not* funded by the Faculty, and the guidelines for commonly requested items.

**Things you can *not* expect to be funded:**

* text books
* any equipment to be retained by the student
* any equipment which the Faculty owns or has access to (e.g., digital recorders)

*The above items, however, may be considered in special circumstances. Talk to the Postgraduate Administrator if you believe you should receive special consideration in this regard.*

**Commonly requested items:**

* Travel within NZ (where warranted: includes transport, accommodation, food)
* Travel overseas (where warranted: includes transport – international and local, accommodation, food)
* Questionnaires (printing, mailing)
* Interloans
* Stationery
* Phone
* Print and photocopy credit
* Conference (presentation of LU research)

Sample budgets are attached (below) to assist you in the development of your budget.

Students are not guaranteed that they will receive the maximum amount, as funding depends on the University allocation to the Faculty and there is no suggestion that thesis research should be fully funded.

## 

## 3. Conferences

**1. POLICY**

The Faculty has a formal policy on the funding of student attendance at conferences.

Students are expected to include conference funding in their research budgets. An amount can be set aside for conference attendance in the research budget, and then approval to attend a *specific* conference can be requested later.  (The response to this request will be based solely on academic criteria.)  The total amounts students can expect (i.e., including conference funding) are $6,000 for a PhD; $2,000 for a Masters thesis; and $500 for a Masters dissertation.  It will be up to students, *in close consultation with their supervisors*, to determine how they will allocate that total sum between ‘research’ and ‘conferences’. (As a general rule, conference funding should be no more than a third of the total budget.) Students will still need to make application for approval of a specific conference attendance, including providing an academic justification for attendance and an itemised budget, using the attached form.

Students should take into account the following factors when considering applying for conference funding:

1. Conferences provide excellent networking and showcasing opportunities for those attending. They allow students to observe and interact with academics, professionals and their peer researchers.
2. Increasingly, however, members of academic staff have to weigh up the pros and cons of attending and presenting at conferences which do not produce pre-published peer-reviewed proceedings or otherwise publishable outputs. Some staff who act as supervisors may be more supportive of conference applications by students which demonstrate a strong likelihood of a publishable outcome, particularly as co-authored works.
3. The annual Lincoln University Postgraduate Conference has been in operation for several years. This event may meet many of the core needs of half-way or near-completing students, i.e., consolidating results and presenting and seeking feedback on unresolved matters. You should discuss this possibility with your supervisors.
4. Fragmentation of disciplines means that more and more specialised conferences are being offered and these may be in locations at very long distances from Lincoln University. The environmental impacts or carbon footprint-effects of conference travel are now an issue, especially for students and academics engaged in research on topics related to the environment e.g., tourism.
5. As a university which has a strong and public commitment to sustainability, Lincoln is paying increased attention to alternatives to face-to-face conferences in distant locations. The status of place-bound conferences, thanks to technological innovations such as the Internet, may decline in the future. Staff and students should always think about the ‘smartest’ yet academically most robust ways of sharing knowledge.
6. If the cost of a conference is $3,000 or more, the student’s supervisors will each need to write a *letter of support* explaining why the student’s attendance is worth this amount of expenditure and confirming that the quality of the research and thesis will not be compromised by making such a large allocation from the student’s total research budget to conference attendance.

You should make separate application to the Postgraduate Studies Committee, Faculty of Environment, Society and Design, c/o Douglas Broughton (see page 15 below for form).

## 4. Students’ and supervisors’ responsibilities

### A. Students’ Responsibilities

Students must have their supervisor’s approval any time they use research funds.

Students must submit GST receipts for all claims. All claims are to be signed by their supervisor.

Any equipment purchased with research funds must be returned to the Faculty upon completion of a student’s degree requirements.

### B. Supervisors’ Responsibilities

The research supervisor is responsible for overseeing the research account of the student. The supervisor must therefore sign any document where the research account number is used or where any claim for reimbursement submitted to the University. Students must check with their supervisors regarding the acceptability of expenses prior to spending research funds.

## 5. Example Budgets

### A. Masters or Honours Dissertation

**Normal maximum is $500 for a dissertation**

PROJECT TITLE: Tourism and dolphins: the experience of backpacker tourists to Banks Peninsula

STUDENT: Heidi Hoe

|  |  |
| --- | --- |
| **Item** | **Total** |
| Printing questionnaires (500 x 5 pages @.06/pg) | $150 |
| Travel to Akaroa (2 trips @ $130/trip)  *food = $50*  *accommodation (1 night @ $80) = $80*  *travel (Akaroa Shuttle) = $100* | $130 |
| Interloans for literature review | $30 |
| Telephone (To arrange trips, follow up) | $40 |
| Photocopy journal articles | $50 |
| Print credit | $100 |
|  |  |
| **Total budget:** | **$500** |

### A. Masters Thesis

**Normal maximum is $2,000**

PROJECT TITLE: The relationship between tourist perceptions of value for money and attraction visitation rates on the Otago peninsula

STUDENT: Helga Hoe

|  |  |
| --- | --- |
| **Item** | **Total** |
| Printing questionnaires (500 x 5 pages @.06/pg) | $150 |
| Travel to Otago Peninsula (2 trips @ $496/trip)  *food = $50*  *accommodation (2 nights @ $60) = $120*  *travel (700km @ .28c/km) = $196* | $732 |
| Interloans for literature review | $100 |
| Telephone (To arrange trips, follow up) | $40 |
| Stationery (thank you notes & postage for attraction operators) (7 attractions x ($3.50/note + .50 postage)) | $28 |
| Photocopy journal articles | $50 |
| Print credit | $100 |
| Conference in New Zealand | $750 |
|  |  |
| **Total budget:** | **$1,950** |

### B. PhD

**Normal maximum is $6,000**

PROJECT TITLE: Riparian management: matching stakeholders’ values to riparian zone classifications

STUDENT: Helmut Hoe

|  |  |
| --- | --- |
| **Item** | **Total** |
| Transport to study areas (1,000km @ 0.38 = $380) | $380 |
| Travel to NIWA - Hamilton (2 trips @ $966/trip)  *food = $200*  *accommodation (5 nights @ $60) = $300*  *airfare = $466* | $1,932 |
| Postage | $150 |
| Interloans for literature review | $350 |
| Stationery | $200 |
| Telephone (To arrange trips, follow up) | $150 |
| Photocopy | $300 |
| Print credit | $250 |
| Conference | $1,900 |
| Contingency (10%) | $380 |
| **Total budget:** | **$5,952** |

## 6. Expenditure

### A. Orders outside the University.

All orders requested of suppliers outside the University must be accompanied by an order number. The order number must be specified on any invoice the University is expected to pay. Contact the Faculty Postgraduate Administrator for an order number. Obviously, any request for order numbers must come within the student’s approved budget. An invoice presented without a Lincoln University order number is the responsibility of the student to pay.

### B. Reimbursing claims.

All claims must be accompanied by a GST receipt for each item. Reimbursement cannot take place without valid proof of purchase or expense.

### C. Advance expenses claims.

All claims must be accompanied by a GST receipt for each item. Reimbursement cannot take place without valid proof of purchase or expense.

### D. Motor vehicle mileage allowance.

The overriding premise of any allowance is that it must be fair and reasonable. The Faculty will accept maximum allowances of:

* 28c/km for high mileage (i.e. long trips) and
* 38c/km for low mileage (i.e. a series of short trips).

However, any total allowance claimed is to be capped at the equivalent cost of a rental vehicle to the University. e.g.:

* 400km in one day @ 28c/km = $112.
* Corporate rental = $55/day + petrol of approx. 10c/km = 400 x .10c = $40
* Therefore total = $55 + $40 = $95 (c.f. $112).

### E. Air travel

(i) Domestic

Domestic and Australian travel should be booked on-line by the Faculty Postgraduate Administrator or the Faculty Finance Administrator (on a University purchase card).

(ii) International

All international travel should be booked via your Faculty postgraduate administrator. You should not purchase tickets yourself and expect a refund, unless prior arrangements are made with the PG administrator. L.U.’s contracted supplier is APX NZ Ltd (Forbes Ground Floor) and you must get a quote from them first of all. If you are able to get a lower quote from another travel company, APX must be given the chance to match it. Only where APX cannot match it (written proof is required) should you book through another agent. However, approval from the Finance Section must be gained prior to making a booking with another agent.

## 7. FESD Postgraduate Conference Application Form

**A. PERSONAL DETAILS**

|  |  |
| --- | --- |
| **Name and ID:** |  |
| **Department:** |  |
| **Supervisors:** |  |

**B. CONFERENCE DETAILS**

|  |  |
| --- | --- |
| **Name of Conference** |  |
| **Duration** |  |
| **Location** |  |

*Note: Provide conference brochure with dates and registration fee. Indicate the type of conference, e.g., specialist symposium etc.*

|  |  |
| --- | --- |
| **Title of the paper you will present** |  |
| **Form of presentation** |  |
| **Authorship** |  |
| **Invited or contributed paper** *(provide copy of letter of invitation)* | Invited  Contributed  |
| **Proposed Travel Dates** |  |

**C. SUPERVISORY ENDORSEMENT**

We confirm that we support the application for conference funding by this student and:

tick box

|  |  |
| --- | --- |
| * have discussed presentation at the LU PG conference * have negotiated and agreed upon authorship matters * have discussed alternative conferences/methods of presenting * can confirm the conference is highly regarded in the discipline * can confirm abstracts for this conference are subject to a formal reviewing process * can confirm the student’s presentation is based on research relating to her/his current programme of study |            |

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| ***Name*** | ***Supervisory role*** | ***Signature*** |
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**D. SUPPORTING INFORMATION**

|  |
| --- |
| **Detail the academic reasons relating to your thesis for attending the conference.** |
|  |

|  |
| --- |
| **Detail the alternatives you have considered to presenting the findings of your research at this conference** |
|  |

**E. FINANCIAL ASSISTANCE SOUGHT**

|  |  |  |
| --- | --- | --- |
| **Expected costs:** *(Detail a breakdown of the expected costs under the following headings. Indicate where external assistance is available) Please note that FESD follows a ‘least reasonable cost’ protocol when approving accommodation and airfares i.e., you should show that your projected travel and accommodation costs are at the budget rather than luxury end of the spectrum.* | | |
|  | ***Cost to FESD*** | ***External Assistance Provided*** |
| **Travel (Airfares)** |  |  |
| **Subsistence Costs**  Conference registration  Conference dinner  Airport / internal transport |  |  |
| **Accommodation Costs** |  |  |
| **Insurance** |  |  |
| **TOTAL** |  |  |

**F. APPLICATION CHECK LIST** *(Tick box)*

|  |  |
| --- | --- |
|  | Yes |
| **Actual dates for departure and return provided** |  |
| **Conference brochures and evidence of registration fee attached.** |  |
| **Supporting information provided.** |  |
| **Supervisory endorsement obtained.** |  |

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| --- | --- | --- |
| ***Applicant’s Signature:*** |  | ***Date :*** |

|  |  |  |
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| ***Postgraduate Subcommittee Recommendation*** | **Approve/Decline** | ***Date:*** |

1. https://tools.ietf.org/html/rfc3986 [↑](#footnote-ref-2)
2. https://tools.ietf.org/html/rfc2616 [↑](#footnote-ref-3)
3. https://www.w3.org/MarkUp/draft-ietf-iiir-html-01 [↑](#footnote-ref-4)
4. https://tools.ietf.org/html/rfc3875 [↑](#footnote-ref-5)
5. <https://trac.nginx.org/nginx/browser/nginx/src/http/ngx_http_file_cache.c?rev=953512ca02c6f63b4fcbbc3e10d0d9835896bf99> [↑](#footnote-ref-6)
6. <https://trac.nginx.org/nginx/browser/nginx/src/http/modules/ngx_http_fastcgi_module.c?rev=953512ca02c6f63b4fcbbc3e10d0d9835896bf99> [↑](#footnote-ref-7)