EDINBURGH NAPIER UNIVERSITY SCHOOL OF COMPUTING

# MSc RESEARCH PROPOSAL

## 1. Student details

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| Last (family) name | MOUCHET |
| First name | Clement |
| Napier matriculation number | 10011053 |

**2. Details of your programme of study**

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| MSc Programme title | MSc INFORMATION SYSTEMS |
| Year that you started your diploma modules | 2010 |
| Month that you started your diploma modules | September |
| Mode of study of diploma modules | Full-time |
| Date that you completed/will complete your diploma modules at Napier | May 2010 |

**3. Academic eligibility to continue to the Masters dissertation module**

Please confirm that status of your module completions by ticking the appropriate box:

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| I have a minimum of 7 15-credit module passes and 1 x F1, or 5 20-credit module passes and 1 x F1, and so I am already eligible to proceed to the MSc dissertation module. | Yes |
| My academic eligibility to continue to the Masters dissertation module is subject to the outcome of module results to be presented at the next exam board. | No |

**4. Fees/debt status**

Please confirm that you have no outstanding debts to the University by ticking the box below. (Students who owe debts to the University, e.g. for fees, library fines, cannot be accepted on to the Masters dissertation module. You should not submit a proposal if you cannot clear your debts in time for the proposal deadline.)

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| I confirm that I have no outstanding debts to the University | Yes |

###### 5. Project outline details

Please suggest a title for your proposed project. If you have worked with a supervisor on this proposal, please provide the name. NB you are strongly advised to work with a member of staff when putting your proposal together.

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| Title of the proposed project | A web based information tool to evaluate the footprint of Edinburgh Napier University SoC |
| Name of supervisor | Neil Urquhart <N.Urquhart@napier.ac.uk> |
| I do not have a member of staff lined up to supervise my work |  |

**6. Brief description of the research area - background**

Please provide background information on the broad research area of your project in the box below. You should write in narrative (not bullet points). The academic/theoretical basis of your description of the research area should be evident through the use of references. Your description should be between half and one page in length.

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| Since the 1990s global warming and climate change have become major concerns. They have attracted attention, and media coverage (Nerlich & Koteyko, 2009) leading governments, organisations and individuals to understand the need to change their energy policies (DTI, 2003). Awareness that “Just like living organisms, products have a life cycle as well.” (UNEP/ SETAC Life Cycle Initiative, 2005) has spread, and, tools such as Life-cycle assessment (LCA) have been designed to help decision-making and tend to a “greener”, more sustainable economy. Individuals and businesses have started a behavioural change, and now think in terms of “Carbon footprint”. The term even entered the dictionary (Nerlich & Koteyko, 2009). Among the large number of initiatives worth mentioning, Carbon Calculators provided by government agencies and non-governmental organizations have a striking success and help motivate this change of behaviour (Padgett, Steinemann, Clarke, & Vandenbergh, 2007) (Bottrill, 2007).  Although the effort to promote more sustainable practices has been rising in IT, this motivation does not often come from the care about the planet but more practically from the will to either reduce energy usage and thus save money or make money by breaking into a new “Green” market. However, initiatives such as Green IT have a real impact: despite the fact IT is only responsible for 2% of the global carbon emission, IT is in a unique position to influence the other 98% (O'Neil, 2010, p. 1). In this context an evaluation of the School of Computing of Edinburgh Napier University “footprint” could help decision making to maintain or renew the current infrastructure, and should help reduce the overall carbon footprint of the University by providing meaningful recommendations to mitigate its impact on the environment.  This study will involve the development of a prototype of Carbon Calculator based on AMEE database (AMEE UK Ltd., 2011) that will enable the user to get a global view of the energy consumption of the IT hardware and a set of devices such as printers and will provide recommendation to help taking saving actions. The tool will be based on AMEE database to ensure the best accuracy of the results, and should follow the recommendations such as the ones presented at the European Council for Energy Efficient Economies Summer Study 2007 (Bottrill, 2007) about presentation and usability as well as the guidelines given in the Technology Acceptance Model (Davis, 1989). The research will include quality assessment, as the software need to be tested and evaluated to make sure it is fit-for-purpose. |

**7. Project outline for the work that you propose to complete**

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| **The idea for this research arose from:**   * A discussion with Rob Kemmer and Neil Urquhart * My interest in sustainability   **The aims of the project are as follows:**   * Conduct a thorough background literature review, and draw conclusions * Design a carbon footprint calculator framework * Implement a calculator capable of supporting an audit of Edinburg Napier University School of Computing IT infrastructure * Successfully manage the project, with the help of project management methodologies   **The main research questions that this work will address include:**   * How to evaluate / assess the carbon footprint of an infrastructure * How to design a fit for purpose information tool for the case study * How to deliver a cleaner, less expensive and more sustainable IT infrastructure * What factors motivate sustainability transformation, and what are the main barriers   **The software development/design work/other deliverable of the project will be:**   * A prototype of a web based information tool that would evaluate the carbon footprint of a part of the School of computing IT resources; calculate this footprint then give recommendation * I will propose a framework to quickly evaluate sustainability of ICT resources   **The project will involve the following research/field work/experimentation/evaluation:**   * I will have to work with AMEE REST API PEAR Library, to retrieve products and their carbon footprint with PHP scripts, this imply I’ll be on a steep learning curve to connect and use their Database * I will have to research existing frameworks to evaluate sustainability of ICT resources in Business or Universities * I need to evaluate existing solutions (personal / business carbon calculators) and follow the recommendation drawn from their review * I will need a comprehensive list of the school of computing resources to provide an audit * I will have to profile the target audience to specify their needs in term of usability and accessibility * The quality and usability of the software need to be tested and evaluated with potential end users   **This work will require the use of specialist software:**   * PHP 5 or better (The PHP Group, 2011) * MySQL 5 or better (Oracle, 2011) * AMEE (Avoiding Mass Extinctions Engine) API & database online environmental data (AMEE UK Ltd., 2011)   AMEE database is a unique option to build a tool capable of calculating the carbon footprint of a wide range device with accurate results.   * jQuery (The jQuery Project, 2010)   **This work will require the use of specialist hardware:**   * *A PHP server with MySQL and access to Internet to connect the AMEE database to send and retrieve data.* |

*Please complete the project outline in the box below. You should use the emboldened text as a framework. Your project outline should be between half and one page in length.*

**8. References**

Please supply details of all the material that you have referenced in sections 6 and 7 above. You should include at least three references, and these should be to high quality sources such as refereed journal and conference papers, standards or white papers. Please ensure that you use a standardised referencing style for the presentation of your references, e.g. APA, as outlined in the yellow booklet available from the School of Computing office and <http://www.dcs.napier.ac.uk/~hazelh/gen_ho/apa.pdf>

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| AMEE UK Ltd. (2011). *Environmental Intelligence, Everywhere.* Retrieved 2011 from www.amee.com: http://www.amee.com/  Bottrill, C. (2007). Internet-based tools for behaviour change. *European Council for Energy Efficient Economies (ECEEE) Summer Study 2007 Dynamics of Consumption Session 9, paper 211* (p. 15). Oxford,: Environmental Change Institute.  Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly* *, 13* (3), 32-40.  DTI, D. o. (2003). *Our energy future - creating a low carbon economy.* London: The Stationery Office.  Heijungs, R., & Udo de Haes, H. A. (2007). Life-cycle assessment for energy analysis and management. *Applied Energy* (84), 11.  Microsoft Corportation. (2010). *Windows User Experience Interaction Guidelines*. Retrieved 02 13, 2011 from http://msdn.microsoft.com/en-us/library/aa511258.aspx  Nerlich, B., & Koteyko, N. (2009). Carbon Reduction Activism in the UK: Lexical Creativity and Lexical Framing in the Context of Climate Change . *Environmental Communication: A Journal of Nature and Culture* , 19.  O'Neil, M. (2010). *GREEN IT FOR SUSTAINABLE BUSINESS PRACTICE An ISEB Foundation Guide* (ISBN 978-1-906124-62-5 ed.). Chippenham, UK: British Informatics Society Limited.  Oracle. (2011). *MySQL :: The world's most popular open source database*. Retrieved 2011 from www.mysql.com: http://www.mysql.com/  Padgett, J. P., Steinemann, A. C., Clarke, J. H., & Vandenbergh, M. P. (2007). A comparison of carbon calculators. *Environmental Impact Assessment Review* (28), 10.  The jQuery Project. (2010). *jQuery: The Write Less, Do More, JavaScript Library*. Retrieved 2011 from jquery.com: http://jquery.com/  The PHP Group. (2011). *PHP: Hypertext Preprocessor*. Retrieved 2011 from www.php.net: http://www.php.net/  UNEP/ SETAC Life Cycle Initiative. (2005). *Life Cycle Approaches The road from analysis to practice .* UNEP/ SETAC Life Cycle Initiative. Paris: UNITED NATIONS PUBLICATION. |

**9. Ethics**

If your research involves other people, privacy or controversial research there may be ethical issues to consider (please see the information on the module website). If the answer below is YES then you need to complete a research Ethics and Governance Approval form (available on the website).

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| Does this project have any ethical or governance issues related to working with, studying or observing other people? (YES/NO) | **No** |

##### 10. Supervision timescale

Please indicate the mode of supervision that you are anticipating. If you expect to be away from the university during the supervision period and may need remote supervision please indicate.

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| Weekly meetings over 1 trimester | Yes *(Thursday or Friday)* |
| Meetings every other week over 2 trimesters |  |
| Other |  |

**11. Submitting your proposal**

Please save this file using your surname, e.g. macdonald\_proposal.doc, and e-mail it to the module leader in time for the next proposal deadline.