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| USQ_Ver_2_BW  | University of Southern Queensland |
| **Higher Degree Research****Thesis Topics for Prospective Postgraduate Students** |

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| **Thesis Topic Title** | Self-learning technology for irrigation and fertiliser management |
| **Thesis Description/Information***(approx 150 words)* | Water savings in the Australia's irrigated agricultural industries can be achieved through irrigation control systems that automatically and optimally adapt to the crop water requirements from real-time sensor data. A common approach for irrigation is from crop stress and soil-water status measurements. Model-based control strategies enable irrigation and crop optimisation using a calibrated crop production model to predict which irrigation application and timing maximises productivity. This project will investigate control strategies and/or crop production models for optimisation of irrigation application. The model used may be industry developed black-box models; alternatively, deep learning may be used for training and predicting crop dynamics based on infield data.  |
| **Thesis Topic Keywords** | Automation, machine vision, irrigation control system |
| **Principal** **Supervisor** |

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| Title: | Dr  |  | Faculty: | Health, Engineering and Sciences |
| First Name: | Alison |  | School: | Agricultural, Computational and Environmental Sciences |
| Surname: | McCarthy |  | Institute: | Institute for Agriculture and the Environment |
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| Tick this box if RegisteredUSQ Supervisor | [x]  |  |  |  |

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| **Associate Supervisor** |

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| Title: | Dr  |  | Faculty: | Health, Engineering and Sciences |
| First Name: | Malcolm  |  | School: | Agricultural, Computational and Environmental Sciences |
| Surname: | Gillies |  | Institute: | Institute for Agriculture and the Environment |
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| **Associate Supervisor** |

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| --- | --- | --- | --- | --- |
| Title: | Click to Select from Drop Down Menu |  | Faculty: | Click to Select from Drop Down Menu |
| First Name: | Click here to enter text. |  | School: | Click to Select from Drop Down Menu |
| Surname: | Click here to enter text. |  | Institute: | Click to Select from Drop Down Menu |
| Staff ID: | Click here to enter text. |  | Centre: | Click to Select from Drop Down Menu |
| Phone No: | Click here to enter text. |  | College: | Click to Select from Drop Down Menu |
| Email: | Click here to enter text. |  | Notes: | Click here to enter text. |
| Tick this box if RegisteredUSQ Supervisor | [ ]  |  |  |  |

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| **Thesis Topic Approval** | [x]  I confirm that my involvement in this research topic has received ‘in principal’ approval from my line manager/project leader. |
| **Open Date**  | 29/02/2016 |
| **Close Date** | 31/12/2016 |
| **Review Date** *(Default 6 months)* | 26/08/2016 |
| **Field of Research\*****(as relates to Thesis Topic)** | *Please enter your* 4 digit *FoR Code.* Please click this link to obtain your 4 digit \* [Field of Research (FoR) code](http://www.abs.gov.au/AUSSTATS/abs%40.nsf/Latestproducts/6BB427AB9696C225CA2574180004463E)

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| ***0*** | ***9*** | ***0*** | ***6*** |

*Maximum 3 entries in total to be indicated*  |
| **Research Affiliations***(Please indicate ALL relevant affiliations)* | [ ]  Faculty of Business, Education, Law & Arts [x]  Faculty of Health, Engineering and Sciences[ ]  Arts and Communication [x]  Agricultural, Computational and Environmental Sciences[ ]  Commerce [ ]  Civil Engineering and Surveying[ ]  Law and Justice [ ]  Nursing and Midwifery[ ]  Linguistics, Adult and Special Education [x]  Mechanical & Electrical Engineering[ ]  Management & Enterprise [ ]  Psychology & Counselling[ ]  Teacher Education and Early Childhood [ ]  Health & Wellbeing[ ]  Open Access College (OAC) [ ]  College for Indigenous Studies, Education and Research (CISER)[ ]  Australian Digital Futures Institute (ADFI) [x]  Institute for Agriculture and the Environment (IAgE)[ ]  Institute for Resilient Regions (IRR) [ ]  Australian Centre for Sustainable Business & Dev (ACSBD)[ ]  Centre for Crop Health (CCH) [ ]  Centre for Excellence in Engineered Fibre Composites (CEEFC)[ ]  Centre for Health Sciences Research (CHSR) [ ]  Computational Engineering and Science Research Centre (CESRC)[ ]  International Centre for Applied Climate Sci (ICACS) [x]  National Centre for Engineering in Agriculture (NCEA) |
| **Academic Program** *(Please indicate ALL relevant programs)* | [x]  Doctor of Philosophy (DPHD) [ ]  Doctor of Applied Science (DASC)[ ]  Doctor of Business Administration (DBAR) [ ]  Doctor of Creative Arts (DCAR)[ ]  Doctor of Education (DEDU) [ ]  Doctor of Professional Studies (DPRS)[ ]  Doctor of Professional Engineering (DPEN) [x]  Master of Engineering (Research (MENR)[ ]  Master of Business Research (MBSR) [ ]  Master of Laws (Research) (LLMR)[x]  Master of Science Research (MSCR) [ ]  Master of Psychology/PhD (Clinical Psychology) MPHD |
| **Scholarship Funding Available**  | [x]  Yes [ ]  No**Details**: Australian Postgraduate Award**URL**: http://www.usq.edu.au/scholarships/usq/australian-postgraduate-award, https://www.usq.edu.au/research/research-at-usq/institutes-centres/ncea/apa-scholarships |
| **Ethics Approval Number/s (if pre-approved)****USQ and/or external party** | [ ]  Yes [ ]  No [x]  Not Applicable**Details**: **Click here to enter text.** |
| **Expectations, Additional Requirements, if any** | **Click here to enter text.** |
| **Project ID** | *For Office Use Only* |