**Naughton REU Application**

**SUMMER INTERNSHIP OFFER OF TRAINING FORM SUMMER 2022**

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| **Proposer details:** | |
| Title: | Dr |
| Name: | Declan O’Loughlin |
| Email: | d.oloughlin@tcd.ie |
| Website: | https://www.tcd.ie/research/profiles/?profile=oloughde |
| If your grade does not allow you to supervise students, please supply the name of support PI: |  |

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| **Student required:** | |
| Specify any previous training / experience the student should have: | |
| Physics or Electronic Engineering background with knowledge or interest in bioelectronics, bioelectromagnetics, electromagnetic simulation software, human body modelling. | |
| Study level (3rd year, 4th year) | Either |
| Any other requirements: | Interest in open-source software/tools |

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| **Traineeship offered:** | |
| Brief job description: (please include (1) type of work, (2) what student should hope to achieve at end of the process, (3) who will supervise student on daily basis (post-doc etc.)) | |
| 1) The student would work on using and adapting open-source electromagnetic simulation tools for the design and testing of novel electromagnetic medical devices. Specifically, the student would adapt existing open-source tools and electrical breast phantoms for the generation of testing data for a microwave breast imaging device. Microwave breast imaging is an emerging novel imaging modality for the detection of breast cancer with multiple clinical trials of the modality published in the last five years. Insights from these trials have motivated interest in the fundamental assumptions and theories of the modality. Currently, despite an increasing number of open-source imaging toolboxes and numerical models, no complete tool-chain from phantom to image exists. The student would work on addressing a key gap in the literature, open-source generation of test data for microwave breast imaging.  2) At the end of the project, the student should hope to have adapted numerical electrical phantoms of the breast for use with open-source electromagnetic simulation tools. The student will learn skills in software development and model development and knowledge of the electrical properties of biological tissues and electromagnetics.  3) The student will work directly with the PI in terms of formal supervision. | |
| Link to research group or supervisor webpage: | https://www.tcd.ie/research/profiles/?profile=oloughde |
| Location of lab: | Áras an Phiarsaigh |

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| **Working hours:** | |
| Number of Weeks offered: | 10 weeks |
| Hours per week: | Full-time |
| Earliest Start Date possible: | May |
| Latest End Date possible: | August |