**RESEARCH SCHOLARSHIP OPPORTUNITY**

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| **Position reference number** | DGT5-ME3 | **Deadline for application** | April, 30th, 2025 |

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| **Institution** | Universidade de São Paulo, Escola Politécnica |
| **Department** | Mechatronics and Mechanical Systems Engineering |
| **Supervisor** | Prof. Dr. Eduardo Aoun Tannuri |

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| **Funding source** | FAPESP | **Type** | MSc Candidate (ME) |
| **Duration (months)** | 36 | **Hours/week** | 40 |
| **Monthly stipend** | R$ 3.120,00   (BRL Brazilian Reais) | | |
| **Workplace** | Escola Politécnica, Universidade de São Paulo, Av. Prof. Melo Moraes 2231, Cidade Universitária, São Paulo SP, Brasil | | |
| **Planned start date** |  | | |

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| **Project title:** Estimation of Environmental Conditions Based on Offshore Vessel Movements and Application of Physics-Informed Machine Learning. | **Título do projeto**  Estimação de condições ambientais baseada nos movimentos de uma embarcação offshore e aplicação de *physiscs infomed machine learning*. |
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| **Research theme**  The objective of this research is to develop and test algorithms that use offshore vessel movement measurements as indirect sensors to estimate the prevailing environmental conditions. The study aims to employ techniques based on Physics-Informed Machine Learning (incorporating both measured data and physical models) to assess ocean waves and currents. The developed method will thus support the decision-making process, enhancing productivity, safety, and increasing operational autonomy. | **Tema de pesquisa**  O objetivo desta pesquisa é desenvolver e testar algoritmos para utilizar as medidas de movimentos de uma embarcação offshore como sensores indiretos para estimar as condições ambientais incidentes. Deve-se prever a utilização de técnicas baseadas em Physics Informed Machine Learning (incorporando dados medidos e modelos físicos) avaliar as ondas e correntes oceânicas. O método desenvolvido, portanto, auxiliará o processo de tomada de decisão, permitindo maior produtividade, segurança e aumentando a autonomia nas operações. |
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| **Project abstract** | **Resumo do projeto** |
| Offshore vessel operations are significantly influenced by the forces resulting from ocean waves, currents, and winds. Therefore, valuable information for managing these systems can be obtained by monitoring the characteristics of the surrounding environment. One alternative to assess these variables is to consider the motion measurements of vessels in operation as indirect indicators of the exciting environmental forces, which has motivated the proposal of different estimation models using Machine Learning or traditional statistical methods.  The approach proposed here is to test algorithms that combine data and physical models, developing neural networks trained with previously measured data (datasets) while respecting the physical assumptions governing the behavior of waves and currents in the oceanic environment. This technique, known as Physics-Informed Machine Learning, has the potential to provide more accurate and reliable estimates. | A operação de embarcações offshore é significativamente influenciada pelas forças resultantes da ação de ondas oceânicas, correntes e ventos. Portanto, informações úteis para o manejo desses sistemas podem ser obtidas através do monitoramento das características do ambiente ao redor. Uma alternativa para avaliar essas grandezas é considerar as medidas de movimento de embarcações em serviço como medidas indiretas das forças ambientais excitantes, o que motivou a proposta de diferentes modelos de estimação utilizando Aprendizado de Máquina ou métodos estatísticos tradicionais. A proposta aqui é testar algoritmos que combinem dados e modelos físicos, desenvolvendo redes neurais treinadas com dados medidos anteriores (dataset), mas que repeitem premissas físicas do compotamento das ondas e correntes do ambiente oceânico. Esta técnica, chamada de *physiscs infomed machine learning*, tem o potencial de fornecer estimativas mais precisas e confiáveis. |

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| **Requirements for the candidate** | **Requisitos para o candidato** |
| Graduation in Engineering, Mathematics, Oceanography or Physics | Graduação em Engenharia, Matemática, Oceanografia ou Física |

**NOTES**

* This research scholarship is offered by the OTIC – Offshore Technology Innovation Centre, a research center based at the University of São Paulo, Brazil.
* The scholarship will cover a standard monthly stipend determined by the funding agencies.
* Foreign candidates must fulfill the immigration requirements and obtain the necessary visas to work as researchers in Brazil. (Help will be offered to the selected candidate.)
* After the application process, potential candidates will be invited for personal or remote interviews.

**REQUIRED DOCUMENTS FOR APPLICATION**

* Single-page presentation letter. Introduce yourself and share your motivations for applying for this position.
* Brief curriculum vitae with academic and professional experience, highlighting the skills that will contribute to this position.
* Recommendation letters (optional). One or two recommendation letters will help support your application.

**APPLICATION PROCESS**

* Prepare an e-mail to [otic.jobs@usp.br](mailto:otic.jobs@usp.br).
* Add “Application to [POSITION\_REF\_NUMBER]” to the subject.
* Gather all required documents above and attach them in PDF format.
* Send your application before the deadline above.

If you have any questions, please write to [otic.jobs@usp.br](mailto:otic.jobs@usp.br).