

# Template for adverting PhD project on FindAPhD.com

\*\*\*\*Please read accompanying guidance notes\*\*\*\*

<b>Department</b>	School of Engineering and the Built Environment
<b>Supervisors</b>	Dr Nazmi Sellami
<b>Funding Status</b>	Funded PhD Project (Worldwide)
<b>Application Deadline</b>	14/04/2022
<b>Project Title</b>	PV soiling: Design of a novel cleaning system

## PROJECT DESCRIPTION

Global warming is mainly due to the high growth in carbon emissions and pollution worldwide. At present, most countries have set carbon reduction goals. They are promoting energy transition to switch from fossil fuels into renewable and clean energy sources (solar, wind and Hydro).

The MENA region (the Middle East and North Africa) has the potential to provide sustainable electricity supply to Europe using solar energy. However, there is a significant problem facing solar farms and PV installations in the desert and polluted areas. The problem is known as PV soiling. It is a major factor that prevents solar irradiation from reaching the cells and significantly reduces the electrical performance of photovoltaic systems.

The conventional PV cleaning systems defeat the purpose of sustainability and renewable energy. They require a considerable quantity of water and energy to perform a frequent cleaning of the solar panels

This project is about designing a novel automated cleaning system to keep the PV panel clean all the time and enhance the performance of the PV installations.

This research project combines computational fluid dynamics (CFD) and experimental work to optimise and design the energy-efficient PV cleaning system.

For more information about the project, don't hesitate to get in touch with Dr Nazmi Sellami

[N.Sellami@Napier.ac.uk](mailto:N.Sellami@Napier.ac.uk)

## Academic qualifications

A first degree (at least a 2.1) ideally in Mechanical Engineering or closely related with a good fundamental knowledge of Fluid Dynamics.

## English language requirement

IELTS score must be at least 6.5 (with not less than 6.0 in each of the four components). Other, equivalent qualifications will be accepted. [Full details of the University's policy](#) are available online.

## Essential attributes:

- Experience of fundamental Mechanical Engineering applied to renewable energy devices
- Competent in Computational Fluid Dynamics
- Knowledge of solar energy
- Good written and oral communication skills
- Strong motivation, with evidence of independent research skills relevant to the project
- Good time management

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<b>Desirable attributes:</b> knowledge of Photovoltaic conversion and efficiency	
<b>Indicative Bibliography</b>	<p>FIGGIS, B., ENNAOUI, A., AHZI, S. &amp; RÉMOND, Y. 2017. Review of PV soiling particle mechanics in desert environments. <i>Renewable and Sustainable Energy Reviews</i>, 76, 872-881.</p> <p>KHAN, M. U., ABBAS, M., KHAN, M. M., KOUSAR, A., ALAM, M., MASSOUD, Y. &amp; JAFRI, S. H. M. 2021. Modeling and design of low-cost automatic self cleaning mechanism for standalone micro PV systems. <i>Sustainable Energy Technologies and Assessments</i>, 43, 100922.</p> <p>SMESTAD, G. P., GERMER, T. A., ALRASHIDI, H., FERNÁNDEZ, E. F., DEY, S., BRAHMA, H., SARMAH, N., GHOSH, A., <b>SELLAMI, N.</b>, HASSAN, I. A. I., DESOUKY, M., KASRY, A., PESALA, B., SUNDARAM, S., ALMONACID, F., REDDY, K. S., MALLICK, T. K. &amp; MICHELI, L. 2020. Modelling photovoltaic soiling losses through optical characterization. <i>Scientific Reports</i>, 10, 58.</p>
<b>Funding notes</b>	This project may be funded by a scholarship of the School of Engineering and Built and Environment. Please see <a href="#">School-funded PhD scholarships - RESEARCH AND INNOVATION (napier.ac.uk)</a> for information on the scholarships and how to apply for them.
<b>Enquiries</b>	For informal enquiries about this PhD project, please contact Dr Nazmi Sellami <a href="mailto:N.Sellami@Napier.ac.uk">N.Sellami@Napier.ac.uk</a>
<b>Web page</b>	<a href="https://www.napier.ac.uk/research-and-innovation/research-degrees/application-process">https://www.napier.ac.uk/research-and-innovation/research-degrees/application-process</a>

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