

<b>Scholarship Project Title</b>	<b>Integrative Mechanical and Molecular Modelling of Microtubule Lattice Dynamics</b>
<b>Advert Reference number</b>	<b>SETU_2024_210</b>
<b>Supervisor(s)</b>	<i>Dr Ondrej Kucera (SETU Waterford), main supervisor Dr Bhaskar Murari (SETU Waterford), co-supervisor Dr Michal Cifra (Czech Academy of Sciences, Prague), co-supervisor</i>
<b>Research Group</b>	<i>N/A</i>
<b>Department /School/Faculty</b>	<i>Dept of Engineering Technology/School of Engineering</i>
<b>Duration</b>	4 Years/48 Months
<b>Status: Full-time / part-time</b>	Full Time
<b>Funding information</b>	SETU 2024 Presidents Scholarship Programme
<b>Value of the scholarship per year for four years</b>	Stipend: €18,500 per annum Fees of €5,750 per annum Research costs- €2,000/€3,000 per annum
<b>Closing date and time</b>	<b>Wednesday 14<sup>th</sup> August 2024 at 4 pm Irish time</b>
<b>Interview date</b>	To be confirmed
<b>PhD commencement date</b>	To be confirmed
<p><b>Project Key Words: (enter 3 to help advertise on online platforms)</b> <i>biophysics, modelling, bioengineering</i></p> <p><b>Post summary</b></p> <p>We are excited to announce a PhD position in our cutting-edge research project focused on microtubules – dynamic protein polymers crucial to various cellular processes, including movement, transport, shape change, and cell division. Microtubules are implicated in numerous diseases, such as cancer and neurodegenerative disorders, making them a vital area of study. Recent findings reveal that the microtubule lattice is more complex than previously thought, displaying structural, chemical, and mechanical heterogeneity far beyond classical dynamic instability. Despite their significance, the transient changes in the microtubule lattice – which occur in response to interactions with other molecules and the cellular environment – remain poorly understood.</p> <p>This project aims to explore these transient lattice changes using advanced modelling techniques. The successful candidate will use molecular dynamics, elastic network modelling, and kinetic modelling to explore transient lattice changes that arise from the interaction of microtubules with other molecules and the physical environment. By integrating these approaches, we aim to uncover how microtubules adapt and respond to their micro-environment and other cellular components. Understanding these mechanisms could shed light on cellular regulatory pathways and contribute to the development of new</p>	

therapeutic strategies for diseases linked to microtubule function.

The PhD candidate will join a cross-disciplinary team, providing an exceptional opportunity to learn from leaders in the field. This role offers a chance to develop a unique expert profile and acquire several transferable skills, laying a solid foundation for a successful career in academia or industry. If you are intellectually curious and have a background in engineering (biomedical or mechanical), physics, biosciences, or other relevant fields, we encourage you to apply. This project offers a meaningful and impactful research experience with significant scientific and biomedical implications.

## Knowledge & Experience

### Essential

- Solid understanding of mechanics or, alternatively, structural biology
- Demonstrated experience with modelling/coding in MATLAB or Python

### Desirable

- Previous experience with molecular dynamics or other modelling approaches
- Elementary understanding of biology

## Skills & Competencies

### Essential

- Applicants whose first language is not English must demonstrate on application that they meet [SETU's English language requirements](#) and provide all necessary documentation. See Page 7 of the Code of Practice
- In order to be **shortlisted for interview**, you must meet the SETU English speaking requirements so please provide evidence in your application.

### Desirable

- Intellectual curiosity, analytical skills, and critical thinking
- Desire for continuous improvement

## Further information

For any informal queries, please contact Ondrej Kucera on email [ondrej.kucera@setu.ie](mailto:ondrej.kucera@setu.ie).

For queries relating to the application and admission process, please contact the Postgraduate Admissions Office

[researchadmissions@setu.ie](mailto:researchadmissions@setu.ie) or telephone +353 (0)51 302883.

For queries relating to the funding programme, please email [scholarships2024@setu.ie](mailto:scholarships2024@setu.ie)

University Website <https://www.setu.ie/>

## Application procedure

Download the Research Postgraduate Application Form from here and return the completed application to [researchadmissions@setu.ie](mailto:researchadmissions@setu.ie) quoting **SETU\_2024\_210** in the email subject line.

**Please note that paper submissions will not be accepted.**

**The University may decide to interview only those applicants who appear from the information they provided, to be the most suitable in terms of experience, qualifications and other requirements of the post.**

**The University will short-list and interview those applicants who provide the most suitable information in terms of experience, qualifications and other requirements relevant to the scholarship.**

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