

<b>Department</b>	School of Computing
<b>Supervisors</b>	Kenny Mitchell
<b>Funding Status</b>	
<b>Application Deadline</b>	
<b>Project Title</b>	Atmospheric Models for Real-time Immersive Rendering
<p><b>PROJECT DESCRIPTION</b></p> <p>We experience our world in an environment that is not an empty vacuum, but filled with air that we breathe. The atmosphere not only provides our breath of life but continuously influences what we see around us. Principled models of this participating media have been developed providing explanations and practice methods for God Rays, sunsets, blue skies, but are limited in the scope of physically based results due to incomplete approximations and ultimately display hardware limitations.</p> <p>In offering this self-funded PhD programme, the successful candidate will develop practical methods for simulation of atmospheric participating media rendering in real-time. Simulating the world visually with graphics hardware acceleration to establish a new level of physically based realism and refinement with outcome of tools, prototypes and applications delivered with state of the art displays to reach potentially millions of people everyday through extended reality (XR) and metaverse platform technologies.</p> <p>Applications from potential part-time students are also welcomed.</p> <p>Prospective applicants are encouraged to contact the Supervisor before submitting their applications. Applications should make it clear the project you are applying for and the name of the supervisor(s).</p> <p><b>Academic qualifications</b></p> <p>A first degree (at least a 2.1) ideally in Computer Science with a good fundamental knowledge of Computer Graphics Rendering.</p> <p><b>English language requirement</b></p> <p>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. <a href="#">Full details of the University's policy</a> are available online.</p> <p><b>Essential attributes:</b></p> <ul style="list-style-type: none"> <li>• Experience of fundamental Mathematics for Rendering Algorithms</li> <li>• Competent in Machine Learning</li> <li>• Knowledge of Neural Rendering</li> <li>• Good written and oral communication skills</li> <li>• Strong motivation, with evidence of independent research skills relevant to the project</li> <li>• Good time management</li> </ul> <p><b>Desirable attributes:</b></p> <p>Programming in C++ and graphical shader languages, e.g. hlsl. Familiarity with modifying and extending real-time graphics engines and offline rendering systems.</p>	
<b>Indicative Bibliography</b>	<p>Z. Velinov, K. Mitchell 'Whole Volume Light Scattering in Homogeneous Finite Media', in 2022 IEEE Transactions on Visualization and Computer Graphics</p> <p>K. Mitchell 'Volumetric light scattering as a post-process', GPU Gems, vol. 3, pp. 275–285, 2007,</p>

	N. Hoffman and K. Mitchell 'Photorealistic Terrain Lighting in Real Time', Game Developer Magazine, CMP Media, Inc, vol. 8, no. 7, pp. 32–41, 2001
<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>