

Department	School of Computing
Supervisors	Dr Jawad Ahmad and Prof. William J Buchanan
Project Title	Chaos-based Mutlimedia Encryption and Watermarking Schemes
<p>PROJECT DESCRIPTION</p> <p>For the past two decades, researchers have reported a close relationship between chaos and cryptography. Encryption based on chaos theory - such as, logistic and tent maps - has several characteristics such as pseudo randomness, ergodicity and strong dependence on initial conditions. Due to highly unpredictable behaviour of chaotic map the method can be applied into the data protection of multimedia content. The aim of this research project is to define light-weight encryption methods and watermarking schemes which can protect multimedia data against eavesdroppers. Furthermore, the proposed schemes will be tested against a number of benchmark security parameters such as correlation, entropy, number of pixel change rate and unified average change intensity, and so on. This work could have a strong impact within areas of data and copy protection.</p> <p>Academic qualifications</p> <p>A first degree (at least a 2.1) ideally in Computer Science, Electrical Engineering, Electronics Engineering, Computer Engineering or Mathematics with a good fundamental knowledge of in mathematics and programming.</p> <p>English language requirement</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. Full details of the University's policy are available online.</p> <p>Essential attributes:</p> <ul style="list-style-type: none"> • Experience of fundamental mathematics and cryptography. • Competent in Good level of implementation skills in one or more programming languages, such as MATLAB, Python and C/C++. • Knowledge of Mathematics and programming. • Good written and oral communication skills • Strong motivation, with evidence of independent research skills relevant to the project • Good time management 	
Indicative Bibliography	<p>A DNA Based Colour Image Encryption Scheme Using A Convolutional Autoencoder, ACM Transactions on Multimedia Computing, Communications, and Applications, https://dl.acm.org/doi/10.1145/3570165</p> <p>A Novel Chaos-Based Privacy-Preserving Deep Learning Model for Cancer Diagnosis, IEEE Transactions on Network Science and Engineering, https://ieeexplore.ieee.org/abstract/document/9858333</p>
Enquiries	For informal enquiries about this PhD project, please contact Dr Jawad Ahmad, J.Ahmad@napier.ac.uk

Web page	https://www.napier.ac.uk/research-and-innovation/research-degrees/application-process
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