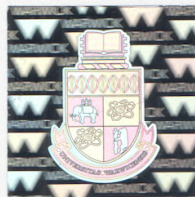


It is hereby certified that  
**Lee James Prangnell**  
was awarded the degree of  
**Doctor of Philosophy  
in Computer Science**

of this University by the Senate on  
Thursday 26th July 2018

---

Vice-Chancellor and President



---

Registrar



**WARWICK**  
THE UNIVERSITY OF WARWICK