

## Call for Graduate Research Assistant

**Project Title** : A New Biometrics Authentication Method Based on Fingertips Epidermis Layer Thickness Measurement  
**Source of Funding** : Ministry of Higher Education - Fundamental Research Grant Scheme  
**Project Duration** : 24 Months  
**Location** : Faculty of Engineering, International Islamic University Malaysia

### Executive Summary:

Authentication process of individuals based on their physical or behavioral characteristics is known as biometrics identification. Popular biometrics identifiers among others are fingerprint, retina, DNA, voice, writing style and gait pattern. Different biometrics authentication methods pose different problems. For example, fingerprint identification is prone to false authentication through the use of fake fingers or fingerprint forgery while other methods such as gait, face pattern, DNA, retina identification would require high cost, complex equipment and algorithm. The trend in biometrics identification research is towards exploring new methods in biometrics authentication based on unconventional, unique and reliable biometrics identifiers. Dermatological studies reported that the thickness of skin layers is unique between individuals due to the content of skin collagen, mixed chemicals, and density. In line with the facts, this research proposed a new method in biometrics authentication based on fingertips epidermis layer thickness using with the facts, this research proposed a new method in biometrics authentication based on fingertips epidermis layer thickness using optical measurement technique. The aims of this research are to explore the possibility of using all five human fingertips epidermis layer thickness as a unique biometrics identifier for authentication and create an algorithm to process the collected thickness data. By using optical measurement technique comprising of reflectance/transmittance measurements of incident light, fingertips epidermis layer thickness can be measured and individual unique profiles can be created. Algorithm will be created to extract, match, and analyze these thickness data which will then store into database for future authentication/verification process. The outcome of this research would lead to the understanding of using all five fingertips epidermis layer thickness profile as a reliable and difficult-to-forgo biometrics identifier. It is expected that this new biometrics authentication method which is faster, accurate, low-cost together with reliable pattern recognition algorithm that addresses the problems of forgery, high cost and complex authentication process could contribute towards overall identity, personal data security and eventually crime reduction.

### Objectives:

1. To introduce new biometrics authentication method based on fingertips epidermis layer thickness.
2. To create algorithm for capturing, extraction, matching and analyzing epidermis thickness data.
3. To evaluate the reliability of the measurement system and algorithm against forgery.

### Benefits of the project (not limited to):

- Attractive monthly allowance.
- Present at local conferences and attend seminars / workshops.
- Pursuing MSc (Mechatronics Engineering) (Full-Time Research Mode).
- Serve as a good platform for future job searching in academia or research positions and for further study to higher level.

### Requirements:

- Bachelor's degree with honours in Electronics/Mechatronics/Electrical Engineering discipline or equivalent, 2nd class and above.
- Candidate must be interested to do a Full-Time Postgraduate Degree (MSc Mechatronics Engineering - Research Mode) at the International Islamic University Malaysia.
- English proficiency is mandatory in both oral and writing.
- Basic knowledge in electronics circuits design/programming is an added advantage.
- Keen in experimental work and enjoy working in lab.
- Proactive, hardworking, self-motivated, able to carry out research work independently with minimal supervision and able to work under pressure.
- Attend weekly meeting with supervisor.

Further details can be discussed via e-mail or face-to-face meeting.

Interested applicants are requested to submit resume (with reference) through email to **Dr. Nadzril Sulaiman (nadzril@iium.edu.my)**.