

HAIRUL HISHAM HAMZAH (PhD)

Chemistry Department, Faculty of Science, UPM, hishamhamzah@upm.edu.my

Research Interests: Fundamental Electrochemistry, 3D-Printed Functional Materials, Electrocatalysis, Electroanalytical Chemistry, Materials Chemistry

INFORMATION

Web of Science : <https://www.webofscience.com/wos/author/record/X-6907-2019>

Scopus Author ID : <https://www.scopus.com/authid/detail.uri?authorId=57210660000>

Google Scholar : <https://scholar.google.com/citations?user=GR9SZjkAAAAJ&hl=en>

H-Index: Web of Science (16), Scopus (16), Google Scholar (21)



Education

PhD in Electrochemistry

University of Southampton, UK | 2013 – 2017

- PhD Thesis Title: A study on estimating DPV surface coverages for chemically modified electrodes.
- Key aspects of PhD research: Understanding the kinetics, mass transport, and thermodynamic properties of chemically modified electrodes using electrochemical techniques that could be employed in various electrochemical applications.
- Supervisor: Professor Philip N. Bartlett

MSc in Analytical Chemistry (Research)

Universiti Putra Malaysia (UPM) | 2007 – 2010

BSc (Hons) Petroleum Chemistry

Universiti Putra Malaysia (UPM) | 2002 – 2006

Work Experience

Senior Lecturer in Chemistry

Chemistry Department, Universiti Putra Malaysia (UPM)

Jun 2026 – Present

Research Fellow in Electrochemistry

Teesside University, Middlesbrough, UK

Jan 2024 – April 2026

- The project received funding from the European Union's Horizon 2020 research and innovation programme.
- Contributed to multidisciplinary collaboration with European consortium partners, including VTT in Finland and MPG in Belgium.
- Contributed to experimental design and data analysis
- Contributed to the development of molecular film systems using cold atmospheric pressure plasma (CAPP).

Senior Lecturer in Chemistry
Universiti Sains Malaysia (USM)
Jan 2018 – December 2023

- Delivered undergraduate teaching in chemistry
- Supervised MSc and PhD students to completion
- Designed and assessed coursework, exams, and laboratory work
- Provided academic advising and mentoring to students
- Conducted research in fundamental and physical electrochemistry, focusing on underlying mechanisms and applications.
- Secured research funding as principal investigator and co-Investigator
- Published in high-impact journals (ACS, RSC, Elsevier)

Postdoctoral Researcher
University of Brighton, UK
May 2017 – November 2017

- Conducted research on 3D-printed electrodes and their applications in bioelectroanalytical chemistry
- Conducted ex vivo sensing studies for serotonin monitoring in biological tissues
- Supported PhD student projects and provided laboratory training.

Foundation Teaching (Lab Demonstrator)
University of Southampton, UK
October 2015 – February 2017

- Supported foundation engineering students during Physics laboratory sessions and tutorials.
- Assisted with marking and feedback on lab reports
- All teaching and laboratory sessions were delivered in coordination with the course leader.

Lecturer in Chemistry
Universiti Teknologi MARA (UiTM), Pahang Campus, Malaysia
July 2007 – February 2013

- Delivered teaching of chemistry for diploma and undergraduate students
- Conducted research in analytical chemistry and biosensors

Supervision Experience

- Supervised PhD and MSc students to successful completion (1 PhD and 3 master's students)
- Supervised undergraduate research projects (16 students)
- Supported students in research design, experimental work, thesis writing, and scholarship application preparation.

Selected Publications (*Corresponding author)

- Syafiq Awang; Nor Syafirah Zambry; Yazmin Bustami; Mohamad Ahmad Najib; Muhammad Fazli Khalid; Beh Khi Khim; Mohamad Adzhar Md Zawawi; **Hairul Hisham Hamzah***; Ismail Aziah, Asrul Nizam Abdul Manaf. A New Aptasensor to Detect S. Typhi Hemolysin E Protein Utilising a Graphene Oxide-Chitosan Modified Printed Circuit Board Gold Electrode, 2025, *International Journal of Biological Macromolecules*, 311, 143534.

- Turgut Sönmez, Jan Uecker, **Hairul Hisham Hamzah**, Regina Palkovits, Mechanistic pathways and kinetic studies of oxygen reduction reaction (ORR) at Covalent Triazine Frameworks (CTFs), 2024, *International Journal of Hydrogen Energy*, 71, 588-599.
- Nor Dyana Zakaria, Ibrahim Luqman Salih, **Hairul Hisham Hamzah***, Turgut Sönmez, Muhamad Huzaifah Omar, Noorhashimah Mohamad Nor, Khairunisak Abdul Razak, Venugopal Balakrishnan, Electrochemical and imaging evaluations of electrochemically activated screen-printed gold electrodes, 2024, *Analyst*, 149(22), 5401-5410.
- Khalil Hussain, Ricoveer Singh Shergill, **Hairul Hisham Hamzah**, Mark S, Yeoman, Bhavik Anil Patel. Exploring different carbon allotrope thermoplastic composites for electrochemical sensing, 2023, *ACS Applied Polymer Materials*, 5, 6, 4136-4145.
- Nor Syafirah Zambry, Mohd Syafiq Awang, Khi Kim Beh, **Hairul Hisham Hamzah***, Yazmin Bustami, Godwin Attah Obande, Muhamad Fazli Khalid, Mehmet Ozsoz, Asrulnizam Abd Manaf, Ismail Aziah. A label-free electrochemical DNA biosensor used a printed circuit board gold electrode (PCBGE) to detect SARS-CoV-2 without amplification, 2023, *Lab on a Chip*, 23, 1622-1636.
- Najahtul Najihah Kamal, Nor Suhana Anuar, Rahmah Noordin, **Hairul Hisham Hamzah***. Electrodeposited gold nanoparticle (AuNP)-film for a label-free electrochemical *Strongyloidiasis* immunosensor, 2022, *Journal of the Electrochemical Society*, 169(10), 106514, 2022.
- Noor Dyana Zakaria, Muhamad Huzaifah Omar, Najahtul Najihah Ahmad Kamal Khairunisak Abdul Razak, Turgut Sonmez, Venugopal Balakrishnan, **Hairul Hisham Hamzah***. Effect of supporting background electrolytes on the nanostructure morphologies and electrochemical behaviours of electrodeposited gold nanoparticles (AuNPs) on glassy carbon electrode surfaces, 2021, *ACS Omega*, 6(38), 24419-24431.
- **Hairul Hisham Hamzah***, Najahtul Najihah Ahmad Kamal, Marta Meneghello, Saiful Arifin Shafiee, Turgut Sonmez, Mohamad Nurul Azmi, Hexanediamine monolayer electrografted at glassy carbon electrode enhances oxygen reduction reaction (ORR) in aqueous neutral media, 2020, *Journal of the Electrochemical Society*, 167, 16, 166508.
- **Hairul Hisham Hamzah***, Wee Chew Chein, and Saiful Arifin Shafiee, Investigating the effects of primary amine linkers with different carbon chain lengths on the acid dissociation constant (pKa) for covalently immobilised anthraquinone at the electrode surface using linear and non-linear fittings, 2019, *Journal of the Electrochemical Society*, 166(16), H877-H887.
- **Hairul Hisham Hamzah**, Oliver Keatch, Derek Covill, Mark Yeoman, Bhavik Anil Patel, 3D printed electrochemical sensor for simultaneous dual monitoring of serotonin overflow and circular muscle contraction, 2019, *ACS Analytical Chemistry*, 91(18), 12014 – 12020.
- **Hairul Hisham Hamzah***, Saiful Arifin Shafiee, Aya Abdalla, Bhavik Anil Patel. 3D printable conductive materials for the fabrication of electrochemical sensors. A mini review, 2018. *Electrochemistry Communications*, 96, 27-31.
- Saiful Arifin Shafiee, Jolyon Aarons, **Hairul Hisham Hamzah**. Electroreduction of peroxodisulfate. A review of a complicated reaction, 2018. *Journal of the Electrochemical Society*, 165(13), H785- H798.
- **Hairul Hisham Hamzah**, Oliver Keatch, Derek Covill, Bhavik Anil Patel. The effects of printing orientation on the electrochemical behaviour of 3D printed carbon black/ABS electrodes, 2018. *Scientific Reports*, 8, 9135.
- **Hairul Hisham Hamzah**, Guy Denuault, Philip N. Bartlett, Aleksandra Pinczewska and Jeremy D. Kilburn. Electrografting of Mono-N-Boc-ethylenediamine from an Acetonitrile/Aqueous NaHCO₃ Mixture, 2017. *Journal of Electrochemistry*, 23(2), 130-140.

Professional Activities

- Training in Graphene Field-Effect Transistor (GFET) Technology at Paragraf, Cambridge, United Kingdom, January 2026.
- Training in cold atmospheric pressure plasma (Belgium, November 2024)
- Invited speaker (electrochemistry, nanomaterials & biosensors workshops/webinars)
- Visiting Research Fellow – University of Brighton (2022)
- Industry collaboration (Tenaga Nasional Malaysia and PETRONAS)

Research Grants

1. **Covalently immobilised biomolecules on 3D conductive carbon nanomaterials for the development of biosensors** (*Principal Researcher*)
Funded by: FRGS, Ministry of Higher Education Malaysia
Amount: RM 132,800 | Duration: Nov 2021 – Sept 2023
 2. **Rapid isothermal amplification for SARS-CoV-2 detection** (*Co-Researcher*)
Funded by: Special Grant RUI COVID-19
Amount: RM 50,000 | Duration: Jul 2020 – Dec 2021
 3. **Digitalised biosensor platform for Typhoid disease surveillance** (*Co-Researcher*)
Funded by: CREST
Amount: RM 854,156 | Duration: Mar 2020 – Aug 2023
 4. **Electrodeposited gold nanoparticles for nucleic acid biosensors** (*Co-Researcher*)
Funded by: Universiti Sains Malaysia (USM)
Amount: RM 26,000 | Duration: Oct 2019 – Feb 2023
 5. **Covalently immobilised monoclonal antibodies for electrochemical immunosensors** (*Principal Researcher*)
Funded by: Universiti Sains Malaysia (USM)
Amount: RM 30,000 | Duration: Dec 2018 – Nov 2021
-

Awards and Recognition

- Endorsed as Global Talent in the UK by the Royal Society, United Kingdom, **2025**.
- Third prize in the final of the Southeast Asian-Global Innovation Challenge **2020** (SEA-GIC 2020), the project entitled "Conversion of dissolved CO₂ into electrical energy using an electrochemical method", organised by the American Chemical Society (ACS) Malaysia Chapter. <https://news.usm.my/index.php/english-news/6887-two-usm-teams-won-regional-global-innovation-challenge-on-climate-change>
- Majlis Amanah Rakyat (MARA) Malaysia, scholarship for PhD study at the University of Southampton, UK, **2013-2017**.
- Public Service Department of Malaysia (JPA), scholarship for undergraduate study at the Universiti Putra Malaysia (UPM), **2002-2006**.
- Certificate of Merit (Class: Distinction) for Australian National Chemistry Quiz by the Royal Australian Chemical Institute (**2000**).