

ANINDITA GANGULY

Postdoctoral Fellow

Phone: +886-905064509 | Email: anin11593@gmail.com | LinkedIn: [anindita-ganguly-4a5391b3](https://www.linkedin.com/in/anindita-ganguly-4a5391b3)

SUMMARY

Skilled and highly motivated materials/electro chemist with 5 years of professional experience, addressing the challenges in electrochemical sensors/storage related materials and technologies. Expertise notably in material synthesis, characterization, physical/chemical property measurements, sensor development. Looking to embark on a post-doctoral position to utilize my strong technical, analytical skills, and my professional experience to create value for the organization through innovative solutions and developing strategic ideas. Proven ability in designing new materials, and optimizing their properties towards electrochemical and biomedical applications.

CORE COMPETENCIES

Bio(chemical) sensors, Nanomaterials synthesis, Materials characterization, Self-powered sensing.

PROFESSIONAL EXPERIENCE

Postdoctoral Fellow

Department of Biomedical Engineering, National Taiwan University, Taiwan

February 2023 – Present (Moved along with my PI from NTHU)

Key Deliverables:

- **Design and development of the sensor** – that involves designing a sensor that can accurately and reliably detect glucose levels in the body.
- **Integration of energy harvesting technology** – using the thermoelectric generator to self-power the sensor. Therefore, the integration of energy harvesting thermoelectric material.
- **Optimization of energy management system** - for regulating and managing the power generated by the thermoelectric generator to ensure maximum efficiency that it is sufficient for the operation of the glucose sensor.
- **Supervision of students** - responsible for supervising graduate students and undergraduate researchers. This involved providing mentorship and guidance, overseeing research projects, and providing feedback on research output.

Postdoctoral Fellow

Institute of Biomedical Engineering, National Tsing Hua University, Taiwan

August 2022 – January 2023

Key Deliverables:

- **Design and development of the sensor** – that involved designing a sensor that can accurately and reliably detect sweat levels extracted from the body.
- **Conduct research and communicate the findings** - through writing manuscripts and reports.
- **Supervision of students** - responsible for supervising graduate students and undergraduate researchers. This involved providing mentorship and guidance, overseeing research projects, and providing feedback on research output.

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Ph.D.

Department of Molecular Science and Engineering, National Taipei University of Technology, Taiwan
September 2018 – July 2022

Key Deliverables:

- **Dissertation title – Synthesis of octadecylamine modified reduced graphene oxide with metal selenide nanocomposites as real-time sensors for anti-infectives.** Synthesis and characterization of reduced graphene oxide with various surface modifications, synthesis and characterization of metal selenides, especially transition metal group (MoSe_2 , CuSe_2 , Ag_2Se , ZnSe , V_2Se_9), composite formation, and their efficient application in development of electrochemical sensor.
- **Grants** – Assisted supervisor in writing research proposals and grants for the National Science and Technology Council (NSTC), Taiwan.
- **Teaching and mentoring** – Teaching assistant for two courses undergraduate and postgraduate level – (a) **Advanced Biomaterials** (b) **Nanotechnology**. Taught courses, prepared and graded assignments.

Research Assistant

Technology Business Incubator, Kalinga Institute of Industrial Technology, KIIT University, Bhubaneswar, India
August 2016 – July 2017

Key Deliverables:

- **Protein purification and characterization** – his-tagged protein purification.
- **Drug conjugation** – conjugating the drug with the protein carrier through chemical modification.
- **Characterization of the molecular needle** – determining the size, stability, and binding affinity to the cancerous cells.
- **In vitro testing** - to evaluate its efficacy in delivering the drug to cancer cells. This involved using cell culture models and assessing the uptake of the drug by cancer cells.

Student intern

Department of Biomedical Engineering, National Institute of Technology, Rourkela, India.
January 2016 – July 2017

Key Deliverables:

- **Synthesis of carbon based materials** – graphene oxide, and reduced graphene oxide nanosheets.
- **Characterization of the synthesized materials** – analytical characterizations to investigate its chemical and physical properties.
- **Studying the effect of these materials** on folding and unfolding of β -galactosidase enzyme.

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EDUCATION

Ph.D.

Materials Science and Electrochemistry

Department of Molecular Science and Engineering, National Taipei University of Technology, Taiwan
September 2018 – July 2022

MS

Biotechnology

School of Bioscience and Technology, Vellore Institute of Technology, Vellore, India.
June 2014 – August 2016

BS

Botany, Zoology, Chemistry

Sambalpur University, India.
2011 - 2014

TECHNICAL SKILLS

- **Transferable** - Project management, Presentation skills, Communication skills, Mentoring, Critical thinking, Data representation and analysis, Manuscript preparation and revision, Scientific peer-review process.
- **Growth/Deposition & sample preparation** - Sol-gel, Hydrothermal growth, Ultrasonication.
- **Device/Material fabrication** - Wearable healthcare sensors, Chemical sensors, 2D materials, Polymer synthesis, Thermoelectric materials, Piezoelectric material, Semiconductor materials, 3D hydrogels.
- **Analytical techniques** - XRD, XPS, FESEM, TEM, AFM, Energy dispersive spectroscopy, UV visible spectroscopy, Photoluminescence spectroscopy, Raman spectroscopy, FT-IR spectroscopy, Fluorescence spectroscopy, Optical microscope, Confocal microscopy, Circular Dichroism, HPLC, Column chromatography, Agarose Gel electrophoresis, SDS-PAGE, 2D Electrophoresis, ELISA.
- **Additional skills** - Cyclic voltammetry, Amperometry, Differential pulse voltammetry, Linear sweep voltammetry, Electrical impedance spectroscopy, Thermoelectric generation, Triboelectric nanogenerator, Wireless recorder (ELITE), Electrometer for electrical/bio signal measurement (Keithley, NI, SR series), Bacterial transfection, His-tagged protein extraction and purification, cell culture and cell line maintenance (HeLa, MCF-7, NCTC-929), Material biocompatibility, microbial culture and maintenance, NGS sequencing, Solvent extraction.
- **Programming languages** - C, C++, basic JAVA, MySQL, HTML
- **Software application tools** - Experienced with working with the relevant software, Image J, Origin, XPSPEAK, Xpert Highscore, VESTA, SketchUp, KeyShot, Microsoft series.

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PUBLICATIONS

2023

- Yen-Han Lai[#], Snigdha Roy Barman[#], **Anindita Ganguly[#]**, Arnab Pal, Jui-Han Yu, Syun-Hong Chou, E-Wen Huang, Zong-Hong Lin*, San-Yuan Chen*. Oxygen-producing Composite Dressing activated by Photothermal and Piezoelectric effects for Accelerated Healing of Infected Wounds. *Nano Energy*, Under review.
- Hwa, K. Y.*, Santhan, A., **Ganguly, A.**, & Sharma, T. S. K. Two dimensional architectures of graphitic carbon nitride with the substitution of heteroatoms for bifunctional electrochemical detection of nilutamide. *Chemosphere*, 320, 138068.
- Hwa, K. Y.*, **Ganguly, A.**, & Santhan, A. Rational effect of CuSe₂ phase with octadecyl amine modified reduced graphene composite for dual-mode sensing of environmental hazardous anthelmintic drug in aquatic and biological samples. *Journal of Environmental Chemical Engineering*, 11(1), 109210.

2022

- Santhan, A., Hwa, K. Y.*, & **Ganguly, A.** Self-assembled nanorods with reduced graphene oxide as efficient nano-catalyst for dual modality sensing of hazardous phenolic compound. *Chemosphere*, 307, 135715.
- **Ganguly, A.**, Hwa, K. Y.*, Santhan, A., & Sharma, T. S. K. (2022). Strategic orchestration of MoSe₂ microspheres on β -cd functionalized rGO: A sustainable electrocatalyst for detection of rifampicin in real samples. *Chemosphere*, 307, 135373.
- Chen, P. C., **Ganguly, A.**, Sharma, T. S. K., Chou, K. Y., Chang, S. M., & Hwa, K. Y.* Investigation of T site variation in spinel aluminates TA12O₄ (T= Mg, Zn & Cu), and formation of electrocatalyst CuAl₂O₄/carbon for efficient sensing application. *Chemosphere*, 301, 134458.
- Tam, C. C. F., Chan, Y. H., Wong, Y. K., Li, Z., Zhu, X., Su, K. J., **Ganguly, A.**, Hwa K.Y., Ling X.B., & Tse, H. F.* Multi-Omics Signatures Link to Ticagrelor Effects on Vascular Function in Patients with Acute Coronary Syndrome. *Arteriosclerosis, Thrombosis, and Vascular Biology*, 10-1161.
- **Ganguly, A.**, Hwa, K.Y.* Construction of zinc selenide microspheres decorated with ODA functionalized rGO as an effective catalyst for the dual mode detection of Chloroquine phosphate. *Materials Today Chemistry*, 24, 100862.
- Sharma, T. S. K., **Ganguly, A.**, Santhan, A., & Hwa, K. Y.* Gadolinium Oxide Nanorods Anchored on g-C₃N₄ Nanosheets for Dual-Mode Electrochemical Determination of Clioquinol in Real-Time Analysis. *ACS Applied Nano Materials*, 5(4), 5208-5222.
- Hwa, K. Y.*, **Ganguly, A.**, Santhan, A., & Sharma, T. S. K.. Construction of three-dimensional/one-dimensional heterostructure of flower-like Sr nanoflowers on Se microrods decorated on reduced graphene oxide: an efficient electrocatalyst for oxidation of promethazine hydrochloride. *Materials Today Chemistry*, 23, 100654.

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- Hwa, K. Y.*, Santhan, A., **Ganguly, A.**, & Sharma, T. S. K. Point of need simultaneous biosensing of pharmaceutical micropollutants with binder free conjugation of manganese stannate micro-rods on reduced graphene oxide in real-time analysis. *Journal of the Taiwan Institute of Chemical Engineers*, 131, 104135.
- Hwa, K. Y.*, **Ganguly, A.**, Santhan, A., & Sharma, T. S. K. Synthesis of water-soluble cadmium selenide/zinc sulfide quantum dots on functionalized multiwalled carbon nanotubes for efficient covalent synergism in determining environmental hazardous phenolic compounds. *ACS Sustainable Chemistry & Engineering*, 10(3), 1298-1315.

2021

- Hwa, K. Y.*, **Ganguly, A.**, Santhan, A., & Sharma, T. S. K. Vanadium Selenide Decorated Reduced Graphene Oxide nanocomposite: A Co-Active Catalyst for the Detection of 2, 4, 6-Trichlorophenol. *Chemosphere*, 282, 130874.
- Hwa, K. Y.*, Santhan, A., **Ganguly, A.**, & Kanna Sharma, T. S.. Synthesis of nickel vanadate anchored on reduced graphene oxide for electrochemical determination of antioxidant radical cations of diphenylamine H•+. *ACS Applied Electronic Materials*, 3(5), 2247-2260.
- Sharma, T. S. K., Hwa, K. Y*, **Ganguly, A.**, Santhan, A. Synthesis of novel three-dimensional flower-like cerium vanadate anchored on graphitic carbon nitride as an efficient electrocatalyst for real-time monitoring of mesalazine in biological and water samples. *Sensors and Actuators: B. Chemical*, 331, 129413.

2020

- Hwa, K. Y*., **Ganguly, A.**, & Sharma, T. S. K. Influence of temperature variation on spinel-structure MgFe₂O₄ anchored on reduced graphene oxide for electrochemical detection of 4-cyanophenol. *Microchimica Acta*, 187(11), 1-13.
- Hwa, K. Y*., Sharma, T. S. K., & **Ganguly, A.** Design strategy of rGO–HNT–AgNPs based hybrid nanocomposite with enhanced performance for electrochemical detection of 4-nitrophenol. *Inorganic Chemistry Frontiers*, 7(10), 1981-1994.
- Hwa, K. Y*., **Ganguly, A.**, Jan, P.S., Sharma, T.S.K., & Wang T.C. Safety assessment control on mouse fibroblast cells compared with various chemically synthesized graphene oxide nanocomposites. *Chemical Papers*, 74, 3047-3056.

PAPER PRESENTATIONS

- Presented a paper on, “Development of a Self-Powered Microneedle Based Wearable Electrochemical Sensor for Glucose Monitoring” at the 243rd ECS Meeting with the 18th International Symposium on Solid Oxide Fuel Cells (SOFC-XVIII)

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- Presented a paper on “Functionalized graphene quantum dots for potential biological evaluation” at the 14th Asian Congress on Biotechnology (June 2019) at Tamsui, Taipei, Taiwan.
- Presented a paper on “Physiological characterization and media optimization of *Magnetospirillum* strains” at the 11th International Conference on Science, Engineering & Technology (November 2015), VIT, India.
- Presented a paper on “Removal of Lead by bacterial biofilms” at the 10th International Conference on Science, Engineering & Technology (May 2015), VIT, India.
- Presented a paper on “Antibacterial activity of Aloe Vera gel and its Endophytes in effective inhibition of human bacterial pathogens” at the 9th International Conference on Science, Engineering & Technology (November 2014), VIT, India.

REFERENCES

1. Prof. Zong Hong Lin

Department of Biomedical Engineering
National Taiwan University,
Taiwan.
Email: zhlin@ntu.edu.tw

2. Prof. Kuo Yuan Hwa

Department of Molecular Science and Engineering,
National Taipei University of Technology,
Taiwan.
Email: kyhwa219@gmail.com

3. Prof. Shen Ming Chen

Department of Chemical Engineering,
Energy and Optoelectronic Materials,
National Taipei University of Technology,
Taiwan.
Email: smchen1957@gmail.com

4. Prof. Shu-Mei Chang

Department of Molecular Science and Engineering,
National Taipei University of Technology,
Taiwan.
Email: f10914@mail.ntut.edu.tw