

## 6<sup>th</sup> International Symposium on Electrochemistry

### “Electrochemistry, meeting societal needs”

03 to 06 April 2023

## Programme

### Oral Presentations

#### Monday 3 April 2023

07:30 – 8:45	Registration
8:45 – 9:20	<b>Opening Ceremony</b> Welcome address Prof Omotayo Arotiba - the Chairperson ElectrochemSA Introduction of Special Guests Opening Addresses: Dean, Faculty of Science, University of Johannesburg
Chair 1	Prof Emmanuel Iwuoha (UWC)
9:20 -9:25	Introduction of Plenary
9:25-10:10	Plenary 1: <b>Prof Marc Cretin</b> (University of Montpellier, France) - <i>Electro- and photo-electro-materials as catalysts for environmental applications: “From the Material to the Process for Environmental Sciences”</i>
10:10 -10:30	O1: <b>Daniel Masekela</b> (UJ) - <i>Application of piezo-photocatalyst thin film (FTO/BaTiO<sub>3</sub>/SnO<sub>2</sub>) for enhanced catalytic degradation of organic pollutants under visible light and ultrasonic vibration</i>
10:30-10:50	O2: <b>Kehinde Jayeola</b> (UJ) – <i>Enhanced photoelectrochemical degradation of ciprofloxacin in wastewater over a Bi<sub>2</sub>O<sub>3</sub>/ZnO heterojunction photoanode</i>
10:50 – 11:10	Tea
Chair 2	Prof Omotayo Arotiba (UJ)
11:10-11:40	Keynote 1: <b>Prof Kwena Desmond Modibane</b> (University of Limpopo, South Africa) - <i>Metal organic framework composites: Synthesis and real-life applications of electrochemistry</i>
11:40 -12:00	O3: <b>Thapelo Mofokeng</b> (WITS) - <i>Electrochemical performance of dual pre-intercalated <math>\alpha</math>-MnO<sub>2</sub> cathode for zinc-ion batteries</i>
12:00-12:20	O4: <b>Prof Mesfin Kebede</b> (UNISA) - <i>The Impact of Synthesis Route on Electrochemical Performance of LiNi<sub>0.6</sub>Co<sub>0.2</sub>Mn<sub>0.2</sub>O<sub>2</sub> Cathode Materials for Lithium-Ion Battery</i>
12:20-12:40	O5: <b>Dr Shawn Gouws</b> (NMU) - <i>Green Hydrogen Production from PEM Electrolyser: A characterization of Oxidative Evolution Reaction Catalysts</i>
12:40-13:00	O6: <b>Dr Katlego Makgopa</b> (TUT) - <i>Nanocomposite materials for high-performance supercapacitor applications</i>
13:00 -14:00	Lunch and visit to exhibitors
Chair 3	Dr Katlego Makgopa (TUT)

14:00-14:30	Keynote 2: <b>Prof Philiswa Nomngongo</b> (UJ) - <i>Nanomaterial-based electrochemical sensing trace metals: From design to application</i>
14:30-14:50	O7: <b>Nyasha Midzi</b> (UJ) - <i>Dendrimer supramolecular architecture based electrochemical biosensor for codeine</i>
14:50-15:10	O8: <b>Prof Mangaka Matoetoe</b> (CPUT) - <i>Functionalized nanoclay electrochemical sensors for pharmaceuticals</i>
15:10-15:40	Keynote 3: <b>Prof Vernon Somerset</b> (CPUT) - <i>Electrochemical Sensors for Environmental Applications</i>
15:40-16:00	Tea break
Chair 4	Prof Philiswa Nomngongo (UJ)
16:00-16:20	O9: <b>Jimodo Jorreta Ogada</b> (WITS) - <i>CeO<sub>2</sub> Enhances the Activity and Durability of Palladium-based Electrocatalysts for Hydrogen Oxidation in Anion-Exchange-Membrane Fuel Cells</i>
16:20-16:40	O10: <b>Mpho Ratsoma</b> (TUT) - <i>Application of N-rGO/NH<sub>4</sub>MnPO<sub>4</sub>·H<sub>2</sub>O nanohybrid as battery-type electrode material in hybrid supercapacitors</i>
16:40-17:00	O11: <b>Daniel Teffu</b> (UL) - <i>High-performance supercattery based on reduced graphene oxide/metal organic framework nanocomposite decorated with palladium nanoparticles</i>
17:05-17:40	6 Flash Poster Presentations: P1, P3, P4, P10, P16, P19
17:40-19:00	Drinks and poster session: All Posters

## Tuesday 4 April 2023

Chair 5	Prof Priscilla Baker (UWC)
8:10-8:15	Introduction of plenary
8:15-9:00	Plenary 2: <b>Prof Sabeth Verpoorte</b> (University of Groningen, Netherlands) - <i>Reading Out Organ-on-a-Chip Systems</i>
9:00-9:20	IO12: <b>Dr Pim De Haan</b> (University of Groningen, Netherlands) - <i>Organs-on-chips for drug studies</i>
9:20 -9:40	IO13: <b>Prof Usisipho Feleni</b> (UNISA) - <i>Nickel Selenide Quantum dot Reactor for Electro-oxidation of Nevirapine in Wastewater</i>
9:40-10:00	O14: <b>Lu-Nita Berrange</b> (UP) - <i>Porphyrin based porous organic polymers enriched with Fe<sub>3</sub>O<sub>4</sub> nanoparticles as electro-sensors for the detection of endocrine disrupting chemicals in water.</i>
10:00-10:20	O15: <b>Dr Kefilwe Vanessa Mokwebo</b> (UWC) - <i>Electrochemical evaluation and voltammetric determination of nevirapine on a boron-doped diamond electrode</i>
10:20-10:40	Tea break
Chair 6	Prof Kwena Modibane (UL)
10:40-11:00	O16: <b>Agnes Mongwe</b> (WITS) - <i>High-entropy spinel oxides as bifunctional electrocatalysts for rechargeable zinc-air batteries</i>
11:00-11:20	O17: <b>Dr Nithyadharseni Palaniandy</b> (IDEAS, UNISA) - <i>NASICON-type NaSn<sub>2</sub>(PO<sub>4</sub>)<sub>3</sub> microstructures and nanorods anode for lithium-, and sodium-ion batteries</i>
11:20-11:40	O18: <b>Siyabonga Patrick Mbokazi</b> (UJ) - <i>Synthesis and Characterization of NiFe<sub>2</sub>O<sub>4</sub> on N, P co-doped carbon nanosheets as an efficient electrocatalyst for oxygen reduction in direct methanol fuel cell</i>
11:40-12:00	O19: <b>Colani Fakude</b> (WITS) - <i>Palladium nanoparticles supported on high-entropy spinel oxide as a highly efficient electrocatalyst for ethanol oxidation reaction</i>
12:00-12:20	O20: <b>Dr Rhiyaad Mohamed</b> (UCT) - <i>High Performance Iridium-based Electrocatalysts for Proton Exchange Membrane Water Electrolysis</i>
12:20-12:50	Keynote 4: <b>Prof Pierre Henri Aubert</b> (CY Cergy Paris University, France) - <i>Vertically aligned carbon nanotubes and conducting polymers: from lab curiosity to scale up</i>
12:50-13:50	Lunch
Chair 7	Prof Omolola Fayemi (NWU)
13:50 – 14:20	Keynote 5: <b>Prof Krishna Bisetty</b> (DUT) - <i>Role of Theoretical, Experimental and Computational Chemistry in Sensors</i>
14:20-14:40	O21: <b>Andisiwe Ngwekazi</b> (UWC) - <i>Electrochemical detection of dopamine at cucurbit[7]uril modified transducers.</i>

14:40-15:00	O22: <b>Dr Ruchika Chauhan</b> (Rhodes University) - <i>Electrochemical characterization of Carbon blacks in different redox probes and their application</i>
15:00-15:20	O23: <b>Clementine Louw</b> (UWC) - <i>Impedimetric spectroscopy immunosensor for in-vitro detection of Cardiac Troponin I</i>
15:20-15:40	O24: <b>Dr Gloria Uwaya</b> (DUT) - <i>Electrochemical Sensing Platform Based on Multiwalled Carbon nanotubes and Cobalt Oxide for the Detection of Epicatechin in Food: supported by Insilco Studies</i>
15:40-16:30	8 Flash Poster Presentation: P21, P25, P27, P31, P32, P33, P37, P40
16:30 –18:00	Drinks and Poster presentations: All Posters
18:00 -	Free evening for networking and collaboration

### Wednesday 5 April 2023

Chair 8	Prof Nonhlangabezo Mabuba (UJ)
8:10-8:15	Introduction of plenary
8:15-9:00	Plenary 3: <b>Prof Jeanet Conradie</b> (University of the Free State, South Africa) - <i>The redox chemistry of bidentate ligands and their metal complexes: Electronic influence of substituent groups</i>
9:00-9:20	O25: <b>Dr Miranda Ndipingwi</b> (UWC) - <i>The Design and Performance of Zinc doped Lithium Manganese Silicate Positive Electrode for Supercapatteries</i>
9:20 -9:40	O26: <b>Christopher Nolly</b> (UWC) - <i>Supercapacitive Effects of Multi-Walled Carbon Nanotubes-Functionalized Spinel Copper Manganese Oxide.</i>
9:40-10:00	O27: <b>Tebogo Mashola</b> (UJ) - <i>Electrocatalytic activity of alumina-silicates supported electrocatalysts for oxygen electro-reduction in alkaline media</i>
10:00-10:20	IO28: <b>Prof Emmanuel Iwuoha</b> (UWC) - <i>Electro-Interferon Gamma Aptasensor TB Test</i>
10:20-10:40	Tea break
Chair 9	Dr Duduzile Nkosi (UJ)
10:45-11:15	Keynote 6: <b>Prof Gugu Mhlongo</b> (CSIR) - <i>Nano-enabled chemi-resistive sensors and their sensing capabilities: Strategic approaches for enhancement of their sensing performance</i>
11:15-11:35	O29: <b>Dr Kaylin Januarie</b> (UWC) - <i>Quantum Dots Electrochemical Aptasensor for TB Biomarker Detection</i>
11:35-12:05	Keynote 7: <b>Prof Esther Fayemi</b> (NWU) - <i>Electrochemical Sensors for Dopamine at Screen-print, Gold and Glassy-carbon Modified Electrodes</i>
12:05-12:30	ElectrochemSA Division meeting
12:30-13:00	Packed Lunch
13:00-	Excursions
19:00	Dinner and Awards

## Thursday 6 April 2023

Chair 10 (8:25 am)	Prof Mangaka Matoetoe (CPUT)
8:30-9:15	Keynote 8: <b>Prof Frank Marken</b> (University of Bath, United Kingdom) - <i>From Microporous Polymer Materials to Ionic Diode Desalination</i>
9:15-9:35	O31: <b>Prof Omotayo Arotiba</b> (UJ) - <i>Photoelectrocatalytic degradation of diclofenac sodium at a Ag-BiVO<sub>4</sub>/BiOI anode and Ag-BiOI cathode dual system</i>
9:35 -9:55	IO32: <b>Prof Nonhlangabezo Mabuba</b> (UJ) - <i>Application of the nanomaterials in freshwater and wastewater quality monitoring and treatment</i>
9:55-10:15	O33: <b>Babatope Ojo</b> (UJ) - <i>Coupling piezo-polarization effect on Ti/BaZrTiO<sub>3</sub> anode with sonoelectro-Fenton oxidation for the removal of aspirin in wastewater.</i>
10:15-10:45	Keynote 9: <b>Prof Priscilla Baker</b> (UWC) - <i>Electrochemical impedance spectroscopy in the investigation of materials characterization and kinetics</i>
10:45-11:05	Closing Ceremony
11:05	Tea time and visits to UJ Lab

**Poster Presentation (03 to 04 April 2023)**

<b>Poster No.</b>	<b>Delegate Name</b>	<b>Title</b>
P1	Funmilola A. Adesanya (NWU)	Electrochemical properties of ZnO/fMWCNTs nanocomposite modified glassy carbon electrode
P2	Sesethu Makaluza (UJ)	Nanomaterial based electrochemical sensors for the detection of nicotine
P3	Dr Dhielnawaaz Abrahams (UWC)	3-Methyl thiophane modified boron-doped diamond (BDD/P3MT) electrodes as efficient phenol detection catalyst for assessing total phenol content in South African tea.
P4	Dr Kanyisa Maqashu (CPUT)	Application of novel Fluorene Clathrate immunosensor for Parvalbumin in Fish
P5	Andrea Siwak (UWC)	Nanostructured immunosensor for low-level detection of waterborne Cryptosporidium
P6	Rezaan Dreyer (UWC)	Developing an electrochemical sensor based on copper modified polymer electrode for the concentration profile of metformin
P7	Onkarabile Pooe (NWU)	SPECTROSCOPY AND CYCLIC VOLTAMMETRY PROPERTIES OF SPEEK/CuO NANOCOMPOSITE AT SCREEN-PRINTED GOLD ELECTRODES
P8	Jaymi January (UWC)	INDIUM NANOPARTICULATE-MODIFIED POLYANILINO-CO-4-AMINOBENZOIC ACID AMPEROMETRIC SENSOR FOR THE DETECTION OF LAPATINIB, A BREAST CANCER DRUG
P9	Teboho Moeketse (UWC)	Uricase biosensing and optimised electrochemical transduction
P10	Laercia Bila (WITS)	WS2/Nitrogen-Doped Onion-Like Carbon Supported Pt Catalyst for the Electro-oxidation of Ethanol in Direct Ethanol Fuel Cells
P11	Dr C Van Der Horst (CPUT)	Application of a Chitosan-Fe/Ag nanocomposite for the detection of cadmium, zinc and lead ions in water samples
P12	Nelia Sanga (UWC)	Chronocoulometric aptasensing of SARS-CoV-2 nucleocapsid protein detection on quantum dot electrodes.
P13	Marlon Oranzie (UWC)	Electrochemical Aptasensing of B-type Natriuretic Peptide-A Biomarker for Myocardial Infarction
P14	Grace Olorundare (UJ)	An electrochemical immunosensor for Alpha-fetoprotein cancer biomarker based on carbon black/palladium nanoparticles platform
P15	Dimpo Sipuka (UJ)	Comparative study of the photoelectrochemical performance of Cu <sub>2</sub> O and BiVO <sub>4</sub> towards the degradation of ciprofloxacin in water
P16	Dr Katekani Shingange (UFS)	Enhanced ethanol sensing abilities of fiber-like La <sub>1-x</sub> Ce <sub>x</sub> CoO <sub>3</sub> (0≤x≤0.2) perovskites based-sensors at low operating temperatures
P17	Dr Duduzile Nkosi (UJ)	A dendrimer - gold nanocomposite based electrochemical aptasensor for the detection of dopamine.
P18	Dr Babatunde Koiki (UJ)	Persulphate assisted photoelectrochemical degradation of non-steroidal anti-inflammatory drug in water on an FTO-AgNPs-Cu <sub>2</sub> O photoanode
P19	Alenzo Murray (UWC)	Determination of binding constants between heavy metal ions and cucurbit[n]uril complexes

P20	Dr Busisiwe Zwane (UJ)	Electro-Fenton/anodic oxidation treatment of pharmaceutical cocktail of Ciprofloxacin, Sulfamethoxazole and Tetracycline in water
P21	Dr Oluchi Nkwachukwu (UJ)	Characterisation and application of bismuth ferrite - bismuth vanadate p-n heterojunction in the photoelectrocatalytic degradation of ciprofloxacin in water
P22	Tshepo Mohlala (UJ)	Photoelectrocatalytic degradation of emerging pollutants in water on an FTO/BiVO <sub>4</sub> /NiS Photoanode
P23	Tsholofelo Sebokolodi (UJ)	Application of FTO/BiVO <sub>4</sub> /ZnIn <sub>2</sub> S <sub>4</sub> heterojunction for the removal of ciprofloxacin
P24	Patience Silinda (UJ)	Photocatalytic degradation of selected highly toxic dyes in water using Ag-TiO <sub>2</sub>
P25	David Mabena (TUT)	Tin Oxide supported on Electrochemically Exfoliated Graphene for Supercapacitor Application
P26	Ostar Seerane (TUT)	The decoration of SnO <sub>2</sub> nanoparticles on N-rGO for supercapacitor applications
P27	Ernst Hechter (WITS)	Magnetic enhancement of high entropy oxide catalysts for ORR and OER
P28	Fitsum Addis Hailu (WITS)	Electrochemical Techniques for Battery Performance Characterization Zinc-air Battery Case
P29	Augustus Lebechi (WITS)	High Entropy Spinel Oxide as a Bifunctional Electrocatalyst for Rechargeable Zinc-Air Battery
P30	Dr Aderemi B Haruna (WITS)	Defect engineered Spinel Li <sub>4</sub> Ti <sub>5</sub> O <sub>12</sub> anode materials for improved lithium-ion batteries
P31	Tebogo Tsekeli (WITS)	Defect-engineered microwave irradiated manganese rich LiNi <sub>0.2</sub> Mn <sub>0.6</sub> Co <sub>0.2</sub> O <sub>2</sub> cathode material for improved lithium-ion batteries
P32	Reinhard Klopper (UP)	The electrochemical reduction of CO <sub>2</sub> to value added products
P33	Tankiso Mashabane (UWC)	Electrochemical sensing of nitrogen species in seawater
P34	Refiloe Modise (WITS)	The Synergistic Effects of Ceria Titanate and Carbon as Supports for Platinum Nanoparticles in Acidic Electrolyte
P35	Marius Ngoepe (WITS)	High Entropy Spinel Oxide CeO <sub>2</sub> @(CoCuFeNiMn) <sub>3</sub> O <sub>4</sub> as bifunctional electrocatalyst for rechargeable zinc-air batteries
P36	Mercy Nduni (WITS)	High-entropy metal oxide supported on onion-like carbon as a catalyst for polysulfide conversion in lithium-sulfur batteries
P37	Masego Ramonyai (WITS)	Hydrolysis effects on the voltammetric analysis of Bi <sup>3+</sup> - is complexation the answer?
P38	Thulani Rani (UWC)	ANTIMICROBIAL ACTIVITY OF GREEN SYNTHESIZED BUCHU-CAPPED IRON NANOPARTICLES ABSORBED IN CHITOSAN HYDROGELS AGAINST GRAM-NEGATIVE ESCHERICHIA COLI AND SALMONELLA TYPHIMURIUM BACTERIAL STRAINS
P39	Prof Jeanet Conradie (UFS)	Redox Chemistry of substituted 2,2':6,2''-terpyridines and their Ru(II) complexes.
P40	Tsholofelo Mosalashuping (NWU)	ZnO-Pc Nanocomposite: Synthesis and spectroscopic characterization