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## **RESEARCH INTEREST**

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Synthesis of molecularly imprinted polymers (MIPs) for determination and remediation of environmental pollutants and synthesis of highly selective hybrid system consisting of multiwalled carbonnanotubes and MIPs for application as recognition elements in sensors towards ultra-trace level detection environmental pollutants.

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## **UNIVERSITY EDUCATION**

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Doctor of Natural Sciences (Chemistry, *magna cum laude*). 2016. Ulm University, Germany  
Master of Science (Chemistry). 2010. University of Nairobi, Kenya  
Bachelor of Science (Chemistry, First Class Honours). 2005. University of Nairobi, Kenya

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## **EMPLOYMENT**

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Sept 2017 –Present: Lecturer, Department of Physical Sciences, Machakos University, Kenya  
August 2011 - Nov 2011: Assistant Lecturer, Kenya Methodist University  
March 2010-June 2010: Part-Time Lecturer, University of Nairobi

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## **ADMINISTRATIVE DUTIES AND MEMBERSHIP OF COMMITEES**

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August 2018 - Present: Chairperson, Department of Physical Sciences  
Sept 2019 – Present: Member of Public Complaints Committee  
August 2018 – September 2019: Acting Chairperson, Public Complaints committee  
July 2018 - August 2018: Deputy Director, Academic Quality Assurance  
Sept 2017 –July 2018: Examinations/Timetabling Coordinator, Department of Biological Sciences, Machakos University, Kenya  
Sept 2017-August 2018: Member of Quality Assurance Policy Committee

## PUBLICATIONS IN PEER-REVIEWED JOURNALS, BOOK CHAPTERS AND CONFERENCE PROCEEDINGS

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### (i) Journal Articles

1. HF EL-Sharif, S. Patel, **EN Ndunda** and SM Reddy. (2022). Electrochemical Detection of Dioctylphthalate using Molecularly Imprinted Polymers and Disposable Electrodes. *Analytica Chimica Acta*. 1196, 339547.  
<https://doi.org/10.1016/j.aca.2022.339547>
2. Moses M. Mwanza, **Elizabeth N. Ndunda**, Geoffrey O. Bosire, Vincent O. Nyamori and Bice S. Martincigh. (2021). Advances in sample pretreatment and detection of PCBs in the environment. *Journal of hazardous materials advances*, 4 (2021) 100028. DOI: [10.1016/j.hazadv.2021.100028](https://doi.org/10.1016/j.hazadv.2021.100028)
3. **Ndunda, E.N.** (2020). Molecularly imprinted polymers: a closer look at the control polymer used in determining the imprinting effect: a mini review. *Journal of Molecular Recognition*, 33(11), e2855. DOI: [10.1002/jmr.2855](https://doi.org/10.1002/jmr.2855)
4. **Ndunda, E. N** and Wandiga, S.O. 2020. Spatial and Temporal Trends of Polychlorinated Biphenyls in Water and Sediment from Nairobi River, Kenya. *Environmental monitoring and assessment*, 192(9), 600
5. **Ndunda, E. N.**, Madadi, V.O. Wandiga, S.O. (2018). Organochlorine pesticides residues in sediment and water from Nairobi River, Kenya: levels, distribution and ecological risk assessment. *Environmental Science and Pollution Research*, 25(34), 34510-34518
6. Madadi, V.O., Wandiga, S, O., **Ndunda, E. N.**, Mavuti, K. M. (2017). Organochlorine Pesticides Residues in Lake Naivasha Catchment Water. *IJSRSET*, 3(5), 139-147
7. **Ndunda, E. N.**, Mizaikoff, B. (2016). Synthesis of stationary phases that provide group recognition for polychlorinated biphenyls by porogenic fragment template imprinting. *Journal of separation science*, 39(5), 939 - 946.
8. **Ndunda, E. N.**, Mizaikoff, B. (2016). Molecularly imprinted polymers for the analysis and removal of polychlorinated aromatic compounds in the environment: a review. *Analyst*, 141(11), 3141 - 3156
9. **Ndunda, E. N.**, Madadi, V. O., Mizaikoff, B. (2015). An alternative clean-up column for the determination of polychlorinated biphenyls in solid matrices. *Environmental Science: Processes & Impacts*, 17(12), 2101 - 2109.
10. **Ndunda, E. N.**, Mizaikoff, B. (2015). Multi-walled carbon nanotubes: innovative sorbents for pre-concentration of polychlorinated biphenyls in aqueous environments. *Analytical Methods*, 7(19), 8034 - 8040.
11. **Ndunda, E. N.**, Mizaikoff, B. (2015). Front cover. *Anal. Methods*, 2015, 7, 7927-7928. DOI: [10.1039/C5AY90078F](https://doi.org/10.1039/C5AY90078F)

### (ii) Book Chapter

1. Japheth M. Nzangya, **Elizabeth N. Ndunda**, Geoffrey O. Bosire, Bice S. Martincigh and Vincent O. Nyamori (2021). Polybrominated Diphenyl Ethers (PBDEs) as

Emerging Environmental Pollutants: Advances in Sample Preparation and Detection Techniques, Emerging Contaminants, Aurel Nuro, IntechOpen, DOI: 10.5772/intechopen.93858. Available from:

<https://www.intechopen.com/chapters/74152>

**(iii) Conference proceedings**

1. **Elizabeth Ndunda** & Moses Mwanza. (2021). Advances in Sensor Technology in Determination of Polychlorinated Biphenyls in the Environment. Manuscript Proceedings of the Machakos University 3<sup>rd</sup> Annual International Conference “Responding to Emerging Global Challenges through Research, Innovation and Technology for Sustainable Development” in Machakos University, Kenya, July 22<sup>nd</sup>-25<sup>th</sup> 2021.

**CONFERENCE PRESENTATIONS**

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1. **Ndunda, E. N.** (October 2021). *Recent Advances in Application of Molecularly Imprinted Polymers for Detection of Pollutants in Aquatic Environment*. The 6th Alexander Von-Humboldt-Kenya “Kollegs” Conference 2021. Kirinyaga University. Oral Presentation
2. **Ndunda, E. N** and Moses Mwanza (June 2021). *Advances in Sensor Technology in Determination of Polychlorinated Biphenyls in the Environment*. Machakos University 3<sup>rd</sup> Annual International Conference. Machakos University, Kenya. Oral Presentation.
3. Mwanza, M. M., **Ndunda, E. N**, Bosire G. O., Martincigh, Bice., Nyamori, V. (June 2021). *Fabrication of Molecularly Imprinted Polymers Based Sensor for Determination of Polychlorinated Biphenyls in The Environment*. Machakos University 3<sup>rd</sup> Annual International Conference. Machakos University, Kenya. Oral Presentation.
4. Nzangya, J. M., **Ndunda, E. N**, Bosire G. O., Martincigh, Bice., Nyamori, V. (June 2021). *Synthesis of Molecularly Imprinted Polymers and their Applications as Adsorbents in Sample Preconcentration in Determination of Polybrominated Diphenyl Ethers*. Machakos University 3<sup>rd</sup> Annual International Conference. Machakos University, Kenya. Oral Presentation.
5. **Ndunda, E. N** (September 2019). *Molecularly imprinted polymers selective to polychlorinated biphenyls and their integration in QCM Sensors*. ANSO-MMU-SAJOREC International Conference. Maasai Mara University, Kenya. Oral Presentation.
6. **Ndunda, E. N** (April 2018). *Molecular imprinting: Challenges and Future Prospects*. Machakos University 1<sup>st</sup> International Conference. Machakos University, Kenya. Oral presentation
7. **Ndunda, E. N** and Mizaikoff, B (May 2017). “*Synthesis of molecularly imprinted polymers providing group recognition for Polychlorinated Biphenyls*”. 9<sup>th</sup> International Conference of the Kenya Chemical Society (KCS), United States International University-Africa (Kenya). Oral presentation.

8. **Ndunda, E. N**, Madadi, V. O and Mizaikoff, B (August 2015). “*Composite-MISPE for the determination of PCBs in solid matrices*” 6<sup>th</sup> Graduate students’ symposium on molecular imprinting, University of Kent (UK). Oral presentation.
9. **Ndunda, E. N** and Mizaikoff, B (March 2015). “*Multiwalled carbon nanotubes solid-phase extraction for the determination of six indicator PCBs in aqueous samples*”. ANAKON Conference. University of Graz (Austria). Poster presentation
10. **Ndunda, E. N** and Mizaikoff, B (March 2015). “*Development of an extraction and clean-up method for rapid analysis of six indicator PCBs in soil, sediment, and water*”. 9. Deutsches Biosensor Symposium. TU München (Germany). Poster presentation
11. **Ndunda, E. N** and Mizaikoff, B (August 2013). “*Molecularly imprinted solid phase extraction (MISPE) for endocrine disrupting compounds*”. 5<sup>th</sup> Graduate students’ symposium on molecular imprinting. Queen's University Belfast (UK). Oral presentation.
12. **Ndunda, E. N** (July 2013). 63<sup>rd</sup> Lindau Nobel Laureate Meeting, Lindau, Germany. Participated as a young scientist.
13. **Ndunda, E. N**, Wandiga, S. O and Shiundu, P. M (November 2009). “*Assessment of Polychlorinated Biphenyls (PCBs) in Sediments and Water from Nairobi River*”. Joint 4<sup>th</sup> Society of Environmental Toxicology and Chemistry (SETAC) Africa meeting and International Conference on Environmental Pollution and Toxicology. Kampala, Uganda. Oral presentation.
14. **Ndunda, E. N**, Wandiga, S. O and Shiundu, P. M (October 2009) “*Assessment of Polychlorinated Biphenyls (PCBs) in Sediments and Water from Nairobi River*”. Joint 6<sup>th</sup> Kenya Chemical Society, East and Southern Africa Environmental Chemistry, and 8<sup>th</sup> Theoretical Chemistry in Africa Conference. Mombasa, Kenya. Oral presentation.

## WORKSHOPS & TRAININGS

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- Grant proposal writing (March 2019). University of Nairobi
- Grant proposal writing (March 2018). Machakos University.
- Scientific writing workshop (April 2015). Ulm University (Germany).
- Powerful presentation skills (October 2014). Ulm University (Germany).
- Training on contemporary mixture analysis using Gas Chromatography Mass spectrometer (GC-MS) (August 2011). Jomo Kenyatta University of Agriculture and Technology (Kenya).
- UNEP-GEF workshop on analysis of persistent organic pollutants in environmental samples (October 2010). University of Nairobi (Kenya).
- Summer school on risk assessment organized by the African Network for Chemical Analysis of Pesticides (October 2009). Makerere University (Uganda).
- “Field IT” for East Africa aimed at training young East African scientists in ecology and conservation through research camps in Lake Naivasha and Lake Natron (September & November 2009).

- Workshop on pesticides residue analysis, quality assurance and control, data analysis and report writing (April 2008). University of Nairobi (Kenya)

## **SKILLS**

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- Practical experience in operating high performance liquid chromatography (HPLC), gas chromatography electron capture detector (GC - ECD), and UV/Vis spectroscopy.
- Basic knowledge in operating gas chromatography mass spectrometer (GC - MS).
- Languages: Fluent in English, Kiswahili, Kikamba, and basic understanding of the German language
- Competent in Microsoft office (Word, Excel, Powerpoint)
- Knowledge of ChemDraw and Sigma Plot softwares
- Good leadership skills, self-motivated, result oriented, and ability to work in a team

## **RESEARCH GRANTS AND SCHOLARSHIPS**

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- MksU internal grant 2021/2022 (Co-PI) KES 700,000
- Royal Society-Royal Society of Chemistry International Exchanges Award (£ 6,000), 2020
- Future Leaders – African Independent Research (FLAIR) fellowship grant (£251,000), 2019
- Workplace Equipment for Returning Experts by Centre for International Migration and Development (CIM) (€ 10, 000), 2018
- DAAD scholarship to pursue a Doctor of Natural Sciences at Ulm University, Germany, 2011
- DAAD scholarship to undertake German Language Course at Goethe Institut, Nairobi, Kenya & Mannheim, Germany, 2011
- University of Nairobi Scholarship to pursue a Master of Science in Chemistry, 2005

## **SUPERVISION OF POSTGRADUATE STUDENTS**

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1. October 2019 - Present: Moses Mwanza Mutiso “Synthesis of Molecularly Imprinted Polymers Selective to Polychlorinated Biphenyls and their Application in Quartz Crystal Microbalance Sensing”
2. October 2019 - Present: Japheth Musili Nzangya “Synthesis of Molecularly Imprinted Polymers and their Application as Adsorbents in Sample Preconcentration Step during Determination of Polybrominated Diphenyl Ethers (PBDEs)”
3. November 2020 – Present: Benedict Muia “Fabrication of Electrochemical Sensor for the Determination of Polychlorinated Biphenyls in the Environment”
4. January 2021 – Present: Abisaki Esitsakha “Surfactant Modified Poly (Amic) Acid Nano-Enabled Filter Membrane For Perchlorate Ion Assessment In Water”

## **JOURNAL AND PROPOSAL REVIEWER**

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African Journal of Pure and Applied Sciences – “Uptake of *p*-Nitrophenol (PNP) from model aqueous solutions using raw and quaternised *Afromomum melegueta* peels”, 2020

Analyst Journal – “Fluorescence Based Detection of Polychlorinated Biphenyls (PCBs) in Water using Hydrophobic Interaction”, 2017

Machakos University Internal Grant – “Graphenated polypyrrole nanocomposite for real-time detection of highly carcinogenic hydrazine in water”, 2017

Machakos University Internal Grant – “A Resource Reservation Protocol (RSVP) Technique for Efficient Wi-Fibre Utilization for e-learning Modules within Machakos University”

## **COMMUNITY SERVICE**

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May 2019 - Present: Executive member of Board of Management at Ngamba Mixed Secondary School.

July 2018 – Judge, National science and technology exhibition organized by young scientists Kenya (YSK)

## **MEMBERSHIP OF PROFESSIONAL BODIES**

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Member of Society for Molecular Imprinting

Member of Kenya Chemical Society

Member of Kenya DAAD Scholars Association (KDSA)

## **REFEREES**

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Prof. Dr. Boris Mizaikoff  
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Ulm University  
Albert-Einstein-Allee 11  
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