

Research Groups in the Department of Mechanical Engineering

No.	Name of research group	Research interests	Group head/team leader	Group members	Current research projects	Completed research projects
1	VAL ue-addition Of waste and mineral R esources for an Innovative Z ero-Waste E conomy (VALORI ZE).	Material Characterizations, Experimental designs and optimization, Iron and steel, zeolites, geopolymer cements, Porcelains, Bio-active carbons, Industrial and agricultural waste valorization for energy, water treatment, and air quality management	Peter W. Olupot	<ol style="list-style-type: none"> 1. Emmanuel Menya 2. Joseph Jjagwe 3. Joel Wakatuntu 4. Medard Turyasingura 5. Tumutungire Mwebembezi 6. Godfrey Ssajja-Ssali 7. Edmond Mpagi 8. Tadeo Mibulo 9. Godfrey Wangi 	<ol style="list-style-type: none"> 1. Metallization of Ugandan Iron Ores. Funding: Science, Technology and Innovation (STI), Office of the President of Uganda. 2. Development of Iron Oxide Nanoparticles from steel waste for Applications in Drinking Water Treatment. Funding: Science, Technology and Innovation (STI), Office of the President of Uganda. 3. Iron oxide-based nanocomposite bio-adsorbents for water treatment. Funding: EPFL-/EXAF-Switzerland. 4. Development of zeolite-based nano-composite filters 	<ol style="list-style-type: none"> 1. Development of a recyclable-water hand-washing facility (ECO-WASH). MakRIF COVID-19 Call. 2019-2020. UGX. 60,000,000 2. Technological Application of Rice Husks in the Production of Activated Carbon for Industrial Applications in Uganda. Funding: Volkswagen Foundation 2015-2019. Eur. 166,000 3. Characterization of rice husks for production of particle boards. Funding: Faculty

					<p>for drinking water treatment in Uganda. Funding: MAPRONANO/MakRIF</p> <p>5. Technology for application of activated carbons from rice husks in water treatment. Funding: Volkswagen Foundation & MakRIF</p> <p>6. Renewable Energies for Africa: Effective Valorisation of Agri-Food Wastes (REFFECT-AFRICA). Funding: European Commission Horizon 2020</p> <p>7. Optimisation of Recirculating Water Treatment Process for a Smart Communal Hand Washing System. Funding: Volkswagen Foundation</p>	<p>Fund. 2013-2014. USD 7000.</p> <p>4. Development of an appropriate technology for production of electric porcelain insulators from ceramic minerals in Uganda. Funding: Volkswagen Foundation 2011-2013. Eur. 30,000</p>
2	Bioproducts from Bio-composites, Bio-plastics, and	Bio-composite plastics, Bio-plastics, Bio-fuels, Bio-char, Composite	Michael Lubwama	Michael Lubwama Vianney Andrew Yiga Victor Alirach	1. Bioplastics development from agricultural residues	1. Upcycling plastic wastes by

	Bio-fuels for sustainable development (Sustainable Bioproducts Group - BioSus)	briquettes, Carbon-based thin films, Surface Engineering, Energy modelling, Product development and process optimization.		Herman Mbabali Ismail Kimuli	<p>2. Bio-char reinforced plastic composites for thermal stability</p> <p>3. Composite briquettes from waste materials with uncommon binding agents</p> <p>4. Developing of sustainable packaging material</p>	<p>incorporating agricultural residues</p> <p>2. Thermal stability of rice husk fiber reinforced PLA</p> <p>3. Development of sustainable packaging material from banana stems and bagasse</p> <p>4. Development of briquettes for domestic cooking applications</p>
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Some Recent Publications from Sustainable Bioproducts Group – Dr. Michael Lubwama

1. Yiga VA, Nuwamanya A, Birungi A, Lubwama M, Lubwama HN (2023) Development of carbonized rice husks briquettes: Synergy between emissions, combustion, kinetics and thermodynamic characteristics. *Energy Reports* 9: 5977-5991. <https://doi.org/10.1016/j.egy.2023.05.066>
2. Lubwama M, Yiga VA, Lubwama HN, Ssempijja I, Kihedu I (2023) Emissions and emission factors for *Dichrostacys cinerea*, *Morus Lactea*, *Pilostigma thonningii*, *Combretum mole*, and *Albizia grandibracteata* firewood species and their charcoals. *Biomass Conversion and Biorefinery*. <https://doi.org/10.1007/s13399-023-04005-2>
3. Mbabali H, Lubwama M, Yiga VA, Were E, Kasedde H (2023) Development of Rice Husk and Sawdust Mycelium-Based Bio-composites: Optimization of Mechanical, Physical and Thermal Properties. *J. Inst. Eng. India Ser. D*. <https://doi.org/10.1007/s40033-023-00458-x>

4. Kimuli I, Lubwama M, Kirabira JB, Sebbit A (2023) Development of a sustainable low-carbon footprint for Greater Kampala Metropolitan Area: The efficacy of a TIMES/CGE hybrid framework. *Energy Reports* 9: 19 – 36. <https://doi.org/10.1016/j.egyr.2022.11.144>
5. Yiga VA, Lubwama M. Olupot PW (2023) Thermal stability of NaOH modified rice husk fiber-reinforced polylactic acid composites: Effect of rice husks and clay loading. *Results in Materials* 18:100398. <https://doi.org/10.1016/j.rinma.2023.100398>
6. Yiga VA, Lubwama M, Opio J, Menya E, Nono D, Lubwama HN (2023) Production and characterization of paper from banana stem fiber: Optimization using box-behnken design (BBD). *Journal of Natural Fibers* 20 (1): 2192019. <https://doi.org/10.1080/15440478.2023.2192019>

Some Recent Publications from the Valorize Group – Dr. Peter W. Olupot

1. J. Jjagwe, **P. W. Olupot**, S. Carrara, Iron oxide nanoparticles/nanocomposites derived from steel and iron wastes for water treatment: A review, *Journal of Environmental Management*, Volume 343, 2023, 118236, ISSN 0301-4797, <https://doi.org/10.1016/j.jenvman.2023.118236>.
2. T. Tibesigwa, **P. W. Olupot** & J.B. Kirabira (2023) Assessment of the techno-economic viability of B10 synthesis from second-generation biodiesel feedstocks in Uganda. *International Journal of Sustainable Energy*, 42:1, 351-373, DOI: [10.1080/14786451.2023.2191144](https://doi.org/10.1080/14786451.2023.2191144).
3. Tibesigwa, T., Iezzi, B., Lim, T.H., Kirabira, J.B., **Olupot, P.W.**, Life cycle assessment of biodiesel production from selected second-generation feedstocks, *Cleaner Engineering and Technology* (2023), <https://doi.org/10.1016/j.clet.2023.100614>.
4. E. Menya, J. Jjagwe, H. M. Kalibbala, H. Storz, **P. W. Olupot**, Progress in Deployment of Biomass-Based Activated Carbon in Point-of-Use Filters for Removal of Emerging Contaminants from Water: A Review. *Chemical Engineering Research and Design* (2023). <https://doi.org/10.1016/j.cherd.2023.02.045>
5. Lutaaya, S.M., **Olupot, P.W.**, Wakatuntu J., Kasedde H. Effects of waste paper on fuel and mechanical properties of biogas digestate-derived briquettes. *Biomass Conversion and Biorefinery* (2023). <https://doi.org/10.1007/s13399-023-03929-z>
6. J. Wakatuntu, **P. W. Olupot**, J. Jjagwe, E. Menya, M. Okure. Optimization of pyrolysis conditions for production of rice husk-based bio-oil as an energy carrier. *Results in Engineering* (2023). <https://doi.org/10.1016/j.rineng.2023.100947>.
7. H.M. Kalibbala, **P.W. Olupot**, O.M. Ambani. Synthesis and efficacy of cactus-banana peels composite as a natural coagulant for water treatment, *Results in Engineering* (2023), doi: <https://doi.org/10.1016/j.rineng.2023.100945>.
8. M. Turyasingura, J. Wakatuntu, M. Lubwama, J. Jjagwe, O. Hensel, **P.W. Olupot**, Optimisation of eggshell-zeolite composite as a potential surfactant adsorbent for hand-washing wastewater, *Case Studies in Chemical and Environmental Engineering* 7 (2023), 100284. <https://doi.org/10.1016/j.cscee.2022.100284>.