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### Biography

**Jackson Mugwe Waithaka**, is an BSc student in Biomedical Engineering at Kenyatta University, specializing in AI for global health. His research focuses on low-cost diagnostics for neonatal conditions in LMICs, with publications in telemedicine and retinal imaging.

## EyeCU: A Low-Cost AI-Enabled Telemedicine System for Retinopathy of Prematurity Screening in Kenya

### Abstract:

Kenya faces a rising burden of Retinopathy of Prematurity (ROP), with approximately 193,000 premature infants born annually and only 115 ophthalmologists available for nationwide screening. Existing imaging systems such as the 3nethra NEO are prohibitively expensive and require specialist presence, resulting in delayed diagnosis and preventable childhood blindness. EyeCU is a decentralized, low-cost ROP screening system integrating smartphone-based imaging hardware with a tri-stage AI diagnostic workflow. The device includes a custom optical module, NIR illumination, a neck rest, and an eyelid speculum, enabling nurses to acquire retinal images directly at the NICU bedside. The software stack performs image enhancement, diagnostic-quality verification ( $MSE < 0.000954$ ), and cloud-based ROP classification achieving 90% sensitivity and 89% specificity. EyeCU lowers equipment cost to \$350 and enables scalable deployment across Kenyan NICUs, supporting earlier detection, reduced specialist burden, and prevention of avoidable blindness. Future enhancements include Kenyan-specific datasets for model refinement.