Ayomide D. Osetoba

PhD Student, Mechanical Engineering, University of Manitoba · Winnipeg, Manitoba, Canada

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SUMMARY

Mechanical engineer and PhD student developing physics-informed machine learning for modelling, state estimation, and intelligent control of agricultural machinery, in partnership with MacDon Industries Ltd. MSc with distinction in vibration-based condition monitoring of rolling element bearings and uncertainty quantification. Experienced in test-rig experiments, data acquisition, multibody simulation in MATLAB Simscape, and Python data pipelines, with hands-on farm machinery experience from Nigeria.

CORE SKILLS

- **Dynamics and control:** kinematic modelling, multibody dynamics, state estimation, vibration analysis.
- **Condition monitoring:** envelope analysis, spectral kurtosis, fast kurtogram, bearing fault diagnostics, experimental data quality.
- **Machine learning and uncertainty:** physics-informed modelling, regression and classification, Bayesian methods, evidential deep learning.
- **Tools:** Python (NumPy, SciPy, scikit-learn, PyTorch, pandas), MATLAB, Simulink, Simscape Multibody, SolidWorks, ADAMS, Git, LaTeX.

RESEARCH & ENGINEERING EXPERIENCE

Graduate Researcher (PhD) **Jan 2026 – present**

Fluid Power and Telerobotics Research Laboratory, University of Manitoba *Winnipeg, Canada*

- Build kinematic and multibody dynamic models of agricultural machinery in Python and MATLAB Simscape Multibody, with industry partner MacDon Industries Ltd.
- Develop state estimation and physics-informed machine learning methods for predictive modelling and intelligent control of machinery working processes.

Graduate Researcher (MSc) **Sep 2023 – Nov 2025**

Centre for Asset Integrity Management (C-AIM), University of Pretoria *Pretoria, South Africa*

- Ran vibration experiments on a bearing test rig: a tapered roller bearing with a seeded outer-race defect, triaxial ICP accelerometers, and HBM QuantumX acquisition at 48 kHz.
- Developed a framework that separates aleatoric from epistemic uncertainty in condition-monitoring data; graded 80% (distinction) and presented as first author at SACAM 2025.
- Applied envelope analysis, spectral kurtosis, and the fast kurtogram to extract bearing fault signatures.

Research Assistant, Solar Thermal Project **Oct 2023 – Feb 2024**

University of Pretoria *Pretoria, South Africa*

- Conducted experiments, logged measurements, and analysed time-series data in Python and MATLAB.
- Built Python data-quality checks (missing steps, time gaps, abnormal durations, outliers) that improved dataset reliability before archiving.

STEM Expert (AI Evaluation) **May – Aug 2026**
Turing *Remote*

- Evaluated AI model responses to graduate-level engineering problems for technical accuracy, and designed and reviewed verifier tasks.

Engineering Intern **Jun – Dec 2018**
Afe Babalola University Farm *Ado-Ekiti, Nigeria*

- Operated and maintained tractors and milling equipment; kept operating logs and maintenance schedules with close attention to safety.

EDUCATION

PhD, Mechanical Engineering, University of Manitoba (GPA 4.50/4.50) 2026 – present
MSc (Applied Science): Mechanics, University of Pretoria (80%, distinction) 2023 – 2025
BScHons (Applied Science): Mechanics, University of Pretoria 2022
BEng, Agricultural and Bioresources Engineering, FUOYE (First Class, 4.5/5.0) 2014 – 2020

PUBLICATIONS

1. **A. D. Osetoba**, S. Schmidt, D. N. Wilke. "Estimating epistemic and aleatoric uncertainties in experimental rolling element bearing condition monitoring data." *SACAM 2025*, Johannesburg, pp. 275–280.
2. D. N. Wilke, **A. D. Osetoba**, S. Schmidt. "Signal-dependent performance of envelope extraction methods." *Results in Engineering*, under revision.
3. F. Fayose, A. Olaniyan, **A. D. Osetoba**, K. Ogunleye, O. Ilesanmi. "Development of a reciprocating weeding machine for commodity crop production." *LASU Journal of Engineering, Science and Technology* 3(1), 2021.

TEACHING, MENTORING & LEADERSHIP

Teaching Assistant and Grader, MECH 3482 Kinematics and Dynamics, University of Manitoba 2026
Teaching Assistant, MSY310 Structural Mechanics, University of Pretoria 2024 – 2025
Senior Mathematics and Physics Tutor, University of Pretoria Pre-University Academy 2023 – 2025
Assistant Lecturer (NYSC), College of Agriculture, Science and Technology, Lafia 2020 – 2021
Mentor, African Leadership Academy (Chevron programme; innovation challenges) 2024, 2026
President, NUESA FUOYE Chapter (Faculty of Engineering student body) 2018 – 2019

PROJECTS & CERTIFICATIONS

- **CutePDF** (ayomideosetoba.github.io/CutePDF): browser-based PDF annotation tool for researchers; files never leave the browser.
- Certified HSE Levels 1, 2 and 3 (Chartered Institute of Environmental Health and Safety, USA); WHMIS (University of Manitoba).
- Languages: English, Yoruba.