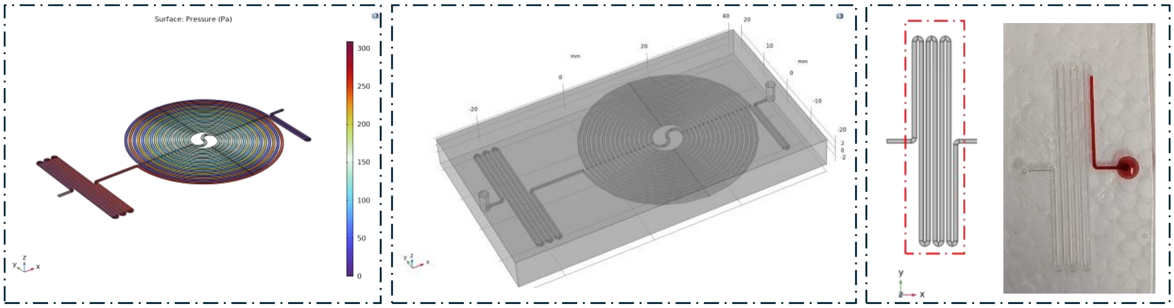
PORTFOLIO (Selected) – O. George Adedokun │ Ph.D. Mechanical Engineering

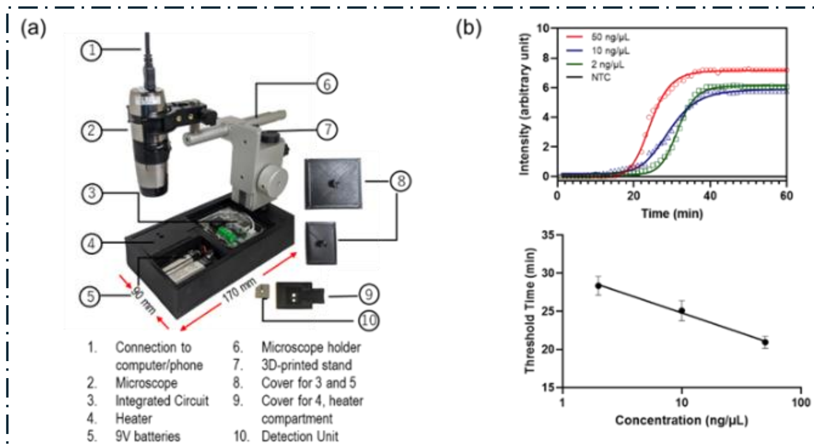
Flexible Wearable Sensor Platform[1]

Developed ergonomic wearable sensor with soft silicone substrate optimized for body conformability. Performed FEA simulation analyzing microfluidic pressure drop and motion artifact response to achieve efficient fluid transport in low-profile form factor. Applied anthropometric design principles for comfortable extended wear.

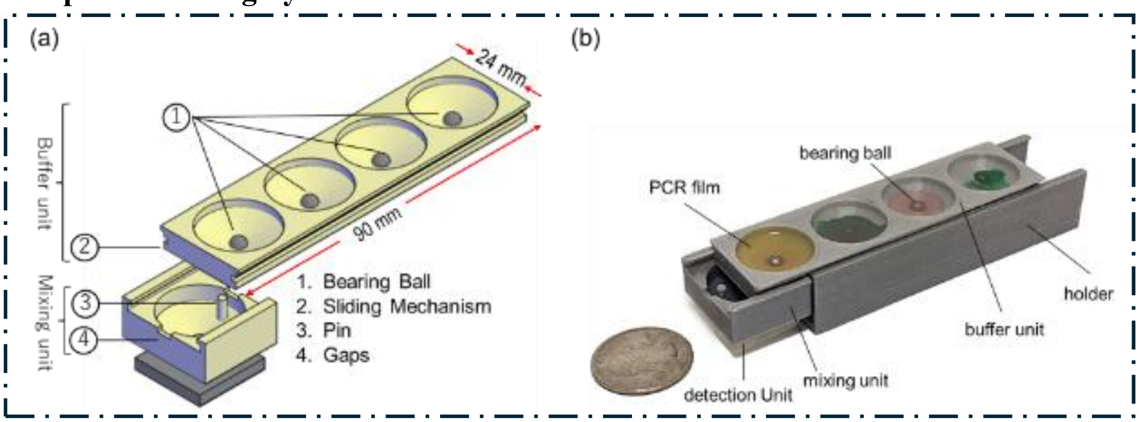


Compact Opto-Electronic System (Imaging Device)[2]

Left: Integrated fluorescence detection system combining cameras, optical sensors, thermal control (±1°C), and electronics in compact enclosure for point-of-care diagnostics (3D-Printed)
Right: Python-based automated test platform for real-time fluorescence image acquisition and analysis



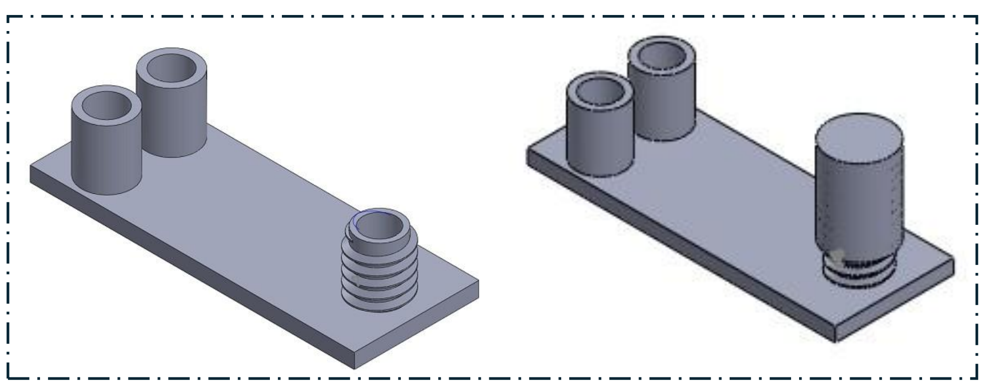
Sample Processing System[2]



Left: CAD design of ball valve mechanism for precision reagent delivery and medical sample processing
Right: 3D-printed functional prototype for design validation and testing

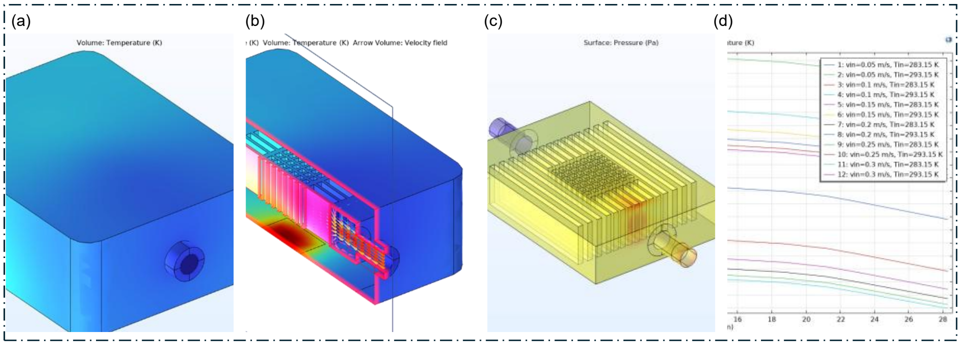
Precision Thermal-Fluidic Actuation System[1]

Designed compact mechatronic system integrating screw-driven actuation with embedded thermal control (±1°C). Optimized spatial efficiency and thermal isolation between subsystems through iterative 3D-printed prototypes. Applied DFM principles for injection-moldable design and scalable manufacturing.

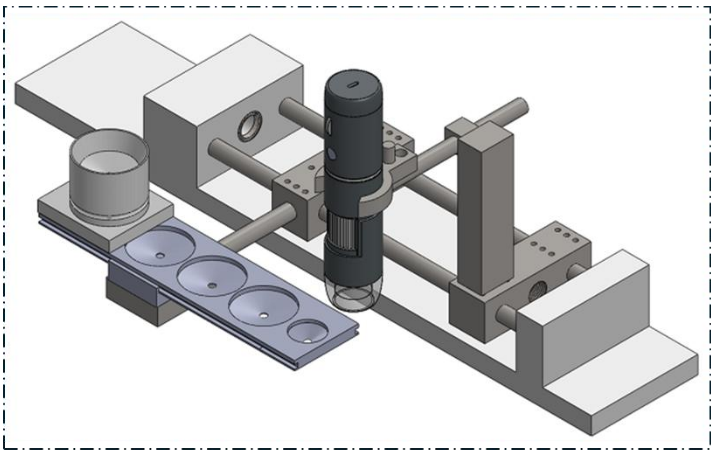


Thermal Management CFD Analysis (COMSOL) [3]

(a) Volume temperature distribution in compact enclosure showing thermal stratification
(b) Cutaway view with velocity field arrows illustrating liquid coolant flow paths through heat exchanger
(c) Pressure drop simulation across fin array heat exchanger showing inlet-to-outlet gradient
(d) Parametric sweep results showing temperature distribution of the chip for varying coolant flow rates (0.05-3 m/s).

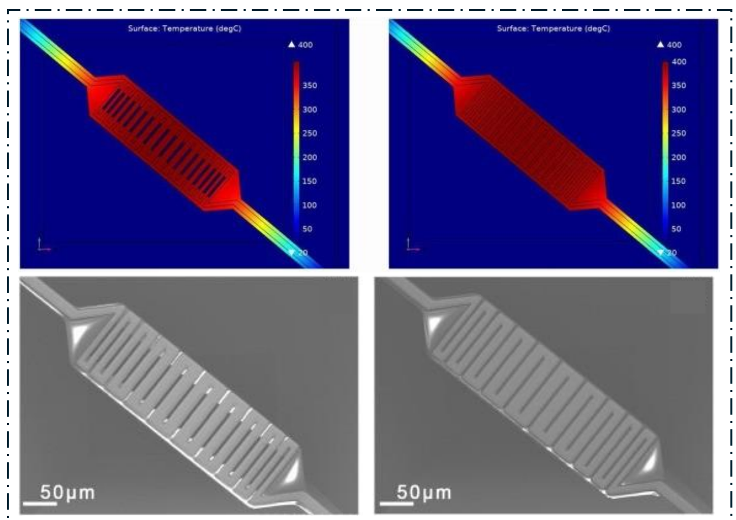


Performed CFD analysis of liquid cooling strategies for power-dense portable electronics. Optimized fin array heat exchanger geometry through coupled thermal and pressure drop simulations. Parametric study validated thermal control capability across flow rates in compact battery-powered assemblies.



Automated Micro-Positioning Platform[3]

"Designed compact motorized XY-stage with integrated camera for programmable scanning and inspection. Engineered low-backlash mechanisms with vibration damping for stable high-resolution imaging. Created modular architecture with consumer-focused industrial design and intuitive tactile controls.



High-Performance Micro-Heater with Perforated Membrane[4]

Top: Thermal FEA comparing perforated (left) vs. solid (right) membrane at 400°C.
Bottom: Fabricated novel micro-heater devices (SEM).
Designed micro-heater achieving 400°C at 15.18mW with 0.42ms response via perforated membrane architecture, reducing power by 18.6%. Optimized geometry enables large-area thermal control without increased power, ideal for battery-constrained portable electronics.

Core Capabilities: Wearable product design • Ergonomics & anthropometry • Precision mechanisms • Opto-mechanical systems • Thermal/structural FEA (ANSYS, COMSOL) • CAD (SolidWorks, NX) • Soft materials integration • DFM/DFA optimization • Rapid prototyping

References:

1. *Unpublished work; manuscript in preparation*
2. *Adedokun, G., et al. Microsyst Nanoeng 10, 181 (2024).* https://doi.org/10.1038/s41378-024-00822-1
3. *Preliminary data, unpublished work*
4. *Adedokun, G., Sensors and Actuators A: Physical 322 (2021): 112607.*