

Jean-Christophe Blancon

Liom Health, Talstrasse 35, Pfäffikon 8808, Switzerland

jcb@liom.com

From benchtop to the wrist: calibration-free, robust transcutaneous spectroscopy for noninvasive glucose sensing

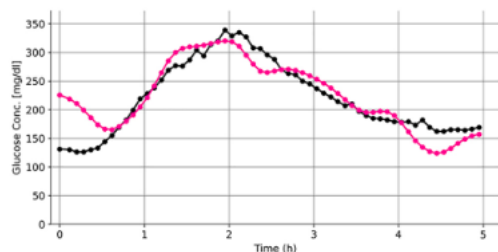
At LIOM, we develop photonic sensors that exploit the molecular specificity of vibrational spectroscopy to detect biomarkers transcutaneously in human skin for real-time, noninvasive health monitoring. By combining tailored near-infrared illumination, optimized spectral collection and detection, and machine-learning analysis, our platform recovers glucose-specific signatures from the interstitial fluid and sub-cutaneous blood, without breaking the skin or collecting a sample. We first establish clinical relevance for glucose in a prospective, single-center study (NCT06272136): operating calibration-free, with no per-subject invasive calibration, the system reached a mean absolute relative difference of 14.5% with 96.5% of paired readings in the A+B zones of the Diabetes Technology Society error grid [1]. In this study we demonstrate both accurate tracking of the glucose concentration over several hours (Figure 1.a) and evidence of the blood glucose signatures in our spectroscopy signals (Figure 1.b). The accuracy values reported are comparable to early-generation needle-based continuous glucose monitors. We then present two breakthroughs on the path to our wrist-worn glucose sensor product: (i) miniaturizing the laser source and Raman spectrometer into a wearable footprint while preserving the signal-to-noise ratio required to monitor biomarkers in the skin continuously, and (ii) a combination of hardware methods that suppress variations in skin composition, enabling robust sensing across a broad range of population under real-world conditions. Together, these results position Liom's technology and calibration-free vibrational spectroscopy as a route to a consumer-grade, multi-biomarker wearable product.

References

[1] M. Rothenbühler, A. Lizoain, F. Rebeaud, A. Perotte, M. Stoffel, J. H. DeVries, J. Diabetes Sci. Technol. 20(3) (2025) 922.

Figures

(a)



(b)

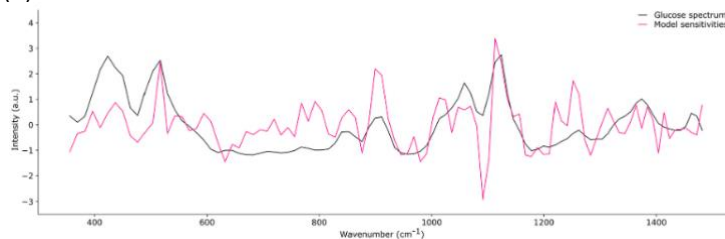


Figure 1: (a) Example of the time series of one subject of the validation cohort in the study (NCT06272136). (b) Model sensitivity compared with glucose spectrum.