

Meaningful monitoring of geotechnical performance with fibre optic sensing.

Lumidas is a technology startup and consulting firm on a **mission to reduce the barrier to adoption of fibre optic sensing technologies for geotechnical monitoring of critical infrastructure.**

We specialize in emerging fibre optic sensing technologies, including **distributed acoustic sensing (DAS)**. Our multidisciplinary approach enables us to develop innovative solutions tailored to complex geotechnical challenges.

OUR SERVICES



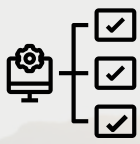
Cable Optimization and Installation Support

Fibre optic cable selection and installation configuration recommendations



Hardware Installation and Commissioning

Support with procurement, installation and commissioning of fibre optic sensing hardware



Processing Automation

Development of automated processing and reporting workflows to streamline fibre optic data processing and interpretation.

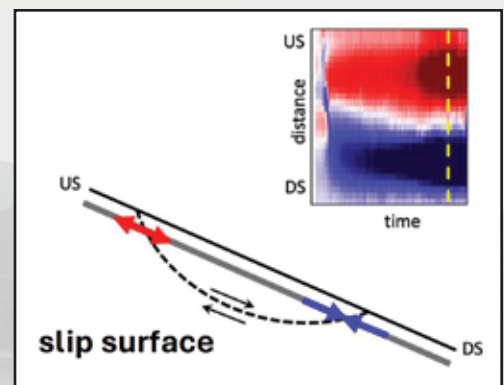


Geotechnical Insights

Analysis and interpretation of fibre optic sensing data alongside collocated geotechnical sensor data to support decision making.



Ouellet et al. 2025. What can fibre optics tell us about tailings dam performance? Tailings and Mine Waste.



Ouellet et al. 2024. Previously hidden landslide processes revealed using distributed acoustic sensing. Nat. Comms.

Why Lumidas?

Inadequate monitoring coverage leads to increased uncertainties of how geotechnical performance is evolving over time.

While conventional geotechnical instrumentation such as inclinometers and piezometers provide critical information on geotechnical performance, they are limited in spatiotemporal resolution, increasing uncertainties in between readings and sensors. Remote sensing methods are becoming an increasingly attractive for geotechnical monitoring over larger areas considering their broad spatial coverage. However, these methods are limited to detecting changes at surface and may become unreliable over periods of construction, a time when monitoring is often at its most critical.

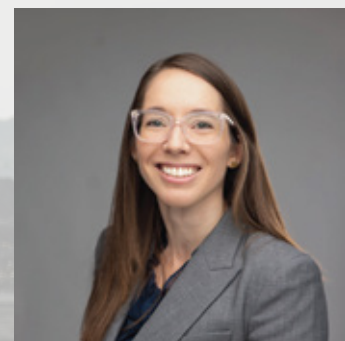
We translate fibre optic sensing data into geotechnical performance indicators.

Lumidas bridges the gap between geotechnical engineers and distributed fibre optic sensing technologies, supporting owners and operators with implementation of distributed fibre optic sensing from project start to end. We provide recommendations on cable selection and installation, working together with owners and operators to optimize the monitoring system over the project duration. By integrating pre-existing collocated sensor data (e.g., strain gauges, thermistors, inclinometers), we help geotechnical engineers get the most out of their fibre optic sensing data by calibrating the data to known measurements. Throughout the monitoring programme, we provide detailed data interpretation and reporting services to inform geotechnical performance.

Contact our team to learn more

Susanne Ouellet, Ph.D., P.Eng., is the Founder and Director of Lumidas. A professional geotechnical engineer with over 11 years experience, Susanne's background spans consulting, research, instrumentation design, and seismic monitoring.

Susanne earned her B.Eng. in Geological Engineering from École Polytechnique de Montréal before completing her Ph.D. at the University of Calgary, where her research advanced tailings dam performance monitoring using distributed acoustic sensing. Her PhD research was recognized with a Mitacs Award for Outstanding Innovation in 2024. Susanne now leads Lumidas' multidisciplinary team in delivering high-resolution monitoring solutions for tailings dams, pipelines, and other critical infrastructure.



Susanne Ouellet, PhD, PEng
Founder & Senior Consultant
Calgary, Canada
susanne@lumidas.ca

Selected Publications

Ouellet, S., Dettmer, J., Mikesell, D., Lato, M., and Karrenbach, M. (2025). Tailings dam performance monitoring by combining coda wave interferometry with distributed acoustic sensing. *ASCE J. of Geotech. and Geoenv. Eng.* <https://doi.org/10.1061/JGGEFK.GTENG-13066>

Watlet, A., Wilkinson, P., Whiteley, J., White, A., Uhlemann, S., Swift, R., **Ouellet, S.**, Minto, C., Meldrum, P., Jones, L., Gunn, D., Godfrey, A., Dashwood, B., Crickmore, R., Clarkson, P., Boyd, J. and Chambers, J. (2024). High-resolution geophysical monitoring of moisture accumulation preceding slope movement - a path to improved early warning. *Environmental Research Letters*. 19, 12. <https://doi.org/10.1088/1748-9326/ad8fbe>

Ouellet, S., Dettmer, J., Lato, M., Cole, S., Hutchinson, J., Karrenbach, M., Dashwood, B. and Chambers, J. (2024). Previously hidden landslide processes revealed using distributed acoustic sensing with nanostrain-rate sensitivity. *Nat Commun* 15, 6239. <https://doi.org/10.1038/s41467-024-50604-6>

Ouellet, S., Dettmer, J., Olivier, G., de Wit, T. & Lato, M. (2022). Advanced monitoring of tailings dam performance using seismic noise and stress models. *Nature Comm. Earth & Environment*. 3, 301. <https://doi.org/10.1038/s43247-022-00629-w>

Selected Conference Proceedings

Ouellet, S., Dettmer, J., Mikesell, T.D., Lato, M. & Karrenbach, M. (2025). What can fibre optics tell us about tailings dam performance? New insights from distributed acoustic sensing. Tailings and Mine Waste, Banff, Canada.

Ouellet, S., Dettmer, J., Crickmore, R., Lato, M., Dashwood, B., Chambers, J., Karrenbach, M., Chavarria, A. (2024). Evaluating strain and temperature variations with low frequency distributed acoustic sensing. SSA Photonics Seismology Meeting, Vancouver, Canada.

Ouellet, S., Dettmer, J., Karrenbach, M., Lato, M., Olivier, G. & Mikesell, D. (2023). Monitoring seismic velocity changes of a tailings dam with distributed acoustic sensing. 2023 Fall Meeting, AGU, San Francisco.

Ouellet, S., Dettmer, J., Karrenbach, M., Olivier, G., & Lato, M. (2023). Combining distributed fibre optic sensing with passive seismic interferometry for advanced monitoring applications. JTC1 Workshop: Impact of global changes on landslide hazard and risk. Paper presented at the meeting of the Joint Technical Committee on Natural Slopes and Landslides of the Federation of International Geo-engineering Societies, Oslo, Norway.