Lakehead UNIVERSITY | Paleo-DNA Laboratory
Centre for Analytical Services

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PDNA-7002 Practical DNA Skills Training Course

This two-week (9 business day) intensive laboratory-based training program is designed to teach students the fundamentals of molecular techniques including DNA extraction, amplification (using PCR), sequencing and interpretation. The course includes training in the latest DNA technologies, including multiplex PCR, real time PCR and use of the 3130xl automated sequencer. The laboratory sessions will have no more than 8 students with our lab instructors.

Laboratory 1: Laboratory Techniques
Laboratory 2: Sample Collection and Preparation
Laboratory 3: Gel Electrophoresis
Laboratory 4: Extraction Procedures
Laboratory 5: Purification Procedures
Laboratory 6: Quantification Procedures
Laboratory 7: Mitochondrial DNA PCR Preparation
Laboratory 8: Gel Electrophoresis
Laboratory 9: Pre-Sequence Purification
Laboratory 10: Sequencing PCR Preparation
Laboratory 11: Post-Sequencing Purification
Laboratory 12: STR Multiplex PCR Preparation
Laboratory 13: Tissue Sample Preparation
Laboratory 14: Computer Lab

The laboratory sessions are designed to follow the general process of the collection and preparation of a sample followed by the extraction and analysis of the DNA. The laboratories will cover the different types of samples that can be used for DNA analysis (buccal, hair, blood, bone) and the different preparation procedures required for each sample type. The participants will learn various DNA extraction methods applied to a variety of tissue types. Students practice on their own DNA samples using PCR (polymerase chain reaction), Multiplex PCR, Real-time PCR, Sequencing, and fragment analysis. Other techniques covered in the lab sessions include gel (Agarose and polyacrylamide) and capillary electrophoresis, measuring, centrifugation and pipetting. The participants will analyze the control region of their own mitochondrial DNA, and STRs (short tandem repeats) within their nuclear DNA. One laboratory session is also dedicated to the computational aspects of analyzing DNA wherein each participant has their own computer and works through databases, websites and programs that are applicable to their analysis or the interpretation of their results.