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Removing a vision-related barrier to geochemical clean laboratory accessibility

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Specialized laboratory requirements will always compete with accessibility requirements, but the right mindset and resources can result in solutions to surmountable barriers. Geochemical clean laboratories are filled with white-to-transparent plastic work surfaces and labware and host workflows that involve the transfer of transparent acid solutions. These laboratory conditions are necessary for sensitive sample handling and to remove contamination sources, but they create a barrier for users with a partial vision impairment that compromises depth perception. One of the most challenging laboratory tasks under these conditions is pipetting accurately between vessels with small openings and without accidental contact of pipette tips with other surfaces. This presentation demonstrates a bespoke pipetting station that was engineered in-house at Memorial University of Newfoundland to allow vision-impaired users to work independently and safely on pipetting tasks. Swappable pipette cradles that can accommodate different pipette sizes are positioned on a swing arm that is movable from a fixed pivot point. The pipette on the swing arm can be positioned above a high-contrast guiding point on the base of the pipette station that allows a user to position a vessel beneath a pipette tip. Rather than the traditional maneuvering of a pipette to vessels for liquid solution transfer, users can lift vessels to a stationary pipette tip for the same tasks. The pipette station was used successfully to prepare samples for ultra-trace element analysis in a clean laboratory at the University of Tübingen with full procedural blanks comparable to those produced from sample preparation with traditional pipetting methods. The pipette station is clean laboratory-compatible with its all-plastic construction and collapsible for efficient transport between different laboratories. The station itself and the design are both available from the first author to aid any other users with similar partial vision impairment. The station is liable to also aid users with other impairments that impede traditional pipetting such as conditions that result in reduced hand motor skills.