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Symposium: Technology in Science

A Lab Quality, Portable Cellphone-Based Microscope For Field Data Collection

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Abstract

Collection of biological samples in the field often presents issues of specimen damage or degradation caused by preservation methods, handling and transport to laboratory facilities for identification. Traditionally, collection of high quality microscopic images in the field has not been a realistic possibility due to the size, weight and fragility of sufficiently high quality hardware. The Fletcher Lab in the Department of Bioengineering at the University of California Berkeley developed a mobile microscope called the CellScope to expand access to basic healthcare in remote regions. Southern California Coastal Water Research Project (SCCWRP) scientists completed successful field tests with the CellScope and have subsequently worked with the Fletcher Lab to modify this clinical tool for in-field microscopic imaging for environmental assessment. SCCWRP has since developed a custom cell-phone application to collect microscopic imagery from the SCCWRP CellScope alongside other cell-phone derived field data (e.g. coordinate location, date, time and field observations). Data collected with the system can be transmitted in real-time to a web-based data system for evaluation and assessment in the office. Together with the CellScope these applications and tools provide an easy-to-use, affordable, lightweight, professional quality data collection platform for environmental monitoring. Future work will move towards developing real-time expert systems for data analysis and image processing able to provide feedback to field scientists while still on site.