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The Scintillator-Layered Imaging Microscope for Environmental Research (SLIMER) E. G. BUCHANAN, M. F. KIDD, Tennessee Tech Univ, S. R. ELLIOTT, K. RIELAGE, Los Alamos National Laboratory, J. N. MURDOCK, R. S. PIRKLE, Tennessee Tech Univ — Identifying the microbes that process nutrients in different ecosystems is vital to understanding those ecosystems. SLIMER is a new detector being developed for this purpose. It incorporates a microcolumnar scintillator in a standard fluorescence microscope coupled with an EMCCD camera. A microbial sample exposed to a radioactive isotope of the nutrient of interest would be scanned by SLIMER. With a goal of a high position resolution, detection of a radioactive event would indicate the area of the slide in which a microbe has absorbed the isotope. The microbes in that location can be sequenced, narrowing down which ones metabolized the nutrient. One potential application of SLIMER is in the study of algae biofilms. An excess of nutrients can result in massive algae growth, damaging water supplies and entire ecosystems. Knowing the microbes that are responsible for the process will result in further understanding of microbial communities in algae, currently of great interest for filtering water systems and mitigating atmospheric CO2. We will report the current status of SLIMER and the development of a corresponding GEANT4 simulation. Ultimately, SLIMER could lead to both control of algae where it is damaging, and artificially produced algae filters where they will be beneficial.

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