Sociedad Argentina de Microbiología General

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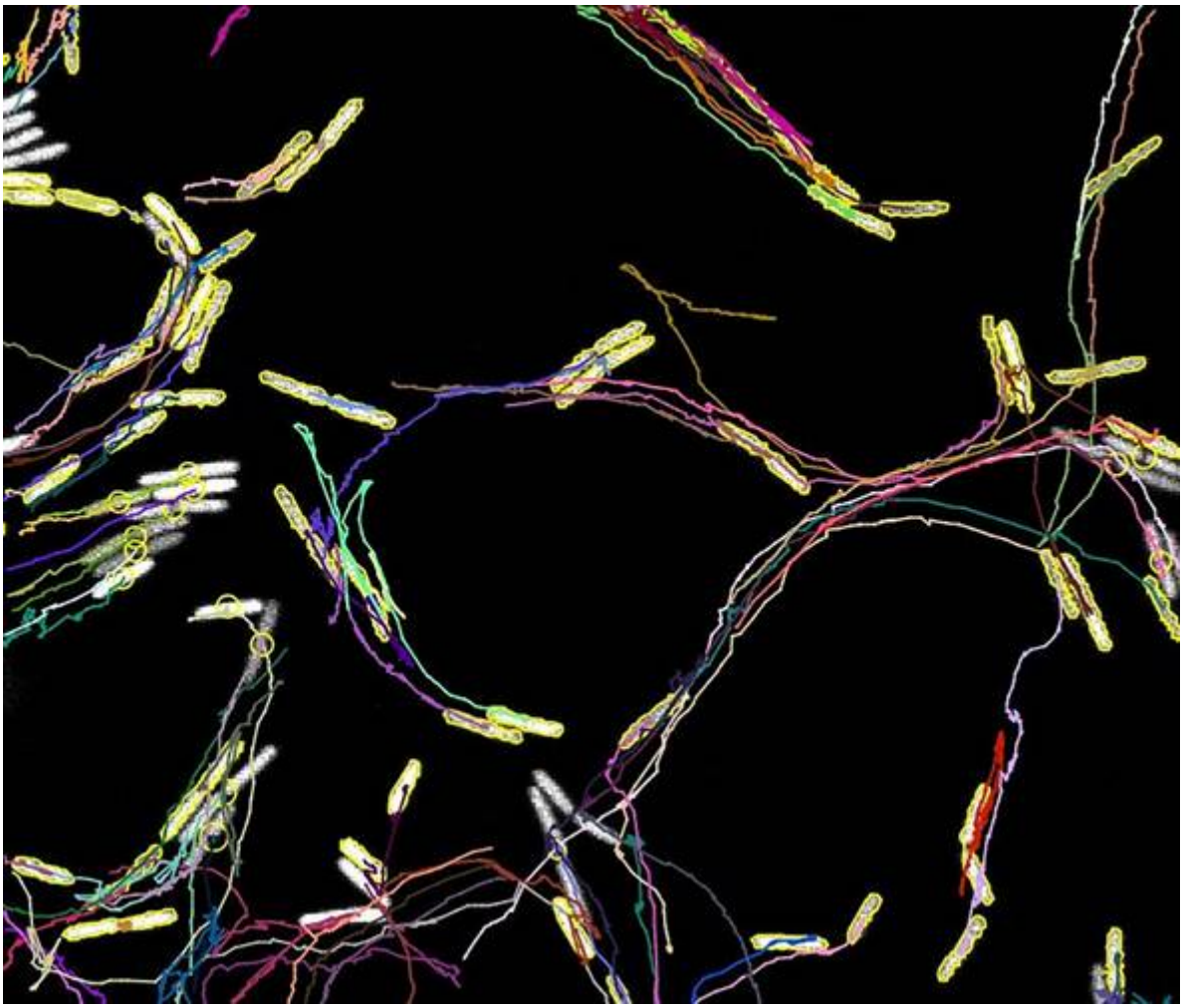

Foto: Se hace camino al andar. Celeste Dea. 1er puesto. Concurso fotográfico SAMIGE 20 años.

VIRTUAL REALITY IN MICROBIOLOGY EDUCATION: DESIGNING AN IMMERSIVE LAB FOR MICROORGANISM COUNTING AND GROWTH CURVES

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Using immersive environments in higher education allows students to explore and experiment with lab procedures often unfeasible in traditional university classrooms due to time and space constraints. This project introduces a digital 3D microbiology lab with interactive tasks, such as microorganism counting and bacterial growth curve analysis, where students can make decisions, interact with objects, and follow procedures. The focus is on key microbiological processes relevant to Pharmacy and Biochemistry professionals that pose the greatest challenges for students. The design and modeling of this immersive experience were part of a university initiative to create digital teaching tools. A 3D microbiology lab was developed with an interdisciplinary team, including researchers, educators, and specialists in technological innovation and pedagogy. Programmers created the digital piece, which was reviewed and refined by the team until the final version was achieved. Typical microbiology lab scenes were designed using a 360° drawing template to create a fully immersive environment. Equipment, workbenches, culture media, and other items were arranged for easy access and visibility, to enhance interaction and the learning experience. Navigation flow and user interactions with objects were also carefully planned. The final digital piece enables users to construct bacterial growth curves at two temperatures, perform culture inoculations, prepare dilutions, and count colony-forming units after incubation. The virtual reality microbiology lab offers a high degree of realism, using photos of actual lab equipment to give users a genuine sense of being in and working within the lab. The 360-degree grid for spatial calculation helped programmers understand spatial needs, which was well-received by the students who tested it. The first implementation took place outside the regular lab, involving technologists, educators, designers, course instructors, and a small group of students to assess the proposed activities and their feasibility for the entire class. Student feedback was gathered

through surveys. The initial implementation with 30 students generated strong interest in the immersive lab experience. Feedback showed that the virtual lab effectively helped with students' understanding of growth curves and microbial counting. Many students found the experience memorable, indicating a positive impact on their learning. The 3D virtual lab using VR transforms microbiology education, turning technology into a powerful learning tool. It allows students to apply concepts to real-world problems and reduces bacterial exposure risks, enabling safe and unrestricted exploration.

Palabras clave: Key Words: Virtual reality (VR) - 3D microbiology lab - Bacterial growth curve