

The University of Tennessee at Chattanooga Student Technology Fee Funding Report

Title: Teaching Microscope set-ups for the Department of Biological & Environmental Sciences (2003-2005)

Unit: Department of Biological & Environmental Sciences

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Project Summary

The Department of Biological & Environmental Sciences acquired equipment to assemble four microscopy/digital imaging/multimedia presentation carts for use in department laboratories. Each cart is comprised of a trinocular compound microscope, a digital imaging system, a computer with monitor, and an LCD projector. The carts have been deployed in department teaching laboratories on all three floors of Holt Hall, with two carts on the second floor where the majority of labs are located. The equipment has been used successfully for direct instruction in the following classes: Functional Human Anatomy (BIOL 191, ~200 students/yr.), Developmental Vertebrate Embryology (BIOL 403, 24 students/yr.), Plant Morphology (BIOL 207, 48 students/yr.), Microbiology (BIOL 311, 60 students/yr. – BIOL 210 ,150 students /yr.) and Individual Studies (BIOL 498). Indirectly, the equipment has been used to prepare digital microscopy images for exams, handout review materials and webpage postings. The most significant success has been in the human anatomy course. Historically, the histology section of the course has been one of the most difficult for the students to grasp and materials generated with the new equipment have enhanced understanding of tissue structure as evidenced by improved grades. An individual studies student used the equipment to provide a digital image library of all the prepared microscope slides used in Introductory Biology (BIOL 121 & 122, approximately 700 students/yr.) for use on the course webpage. The equipment will be used in additional courses this semester.

Project goals and objectives.

The objective to place new microscope/imaging/projection carts in each of our microscope-based laboratories has been met. The equipment has been used in direct instruction, in the preparation of photomicrographs for use in handouts, web-based resources, laboratory exercises and examinations, and to give students experience using state-of-the-art microscopy and digital imaging equipment.

Methodology.

The funded amount of this grant was \$30,248. By January 2005 purchases were made and the four carts were deployed in teaching laboratories and used in spring semester courses. These purchases accounted for \$19,943 of the grant budget. After use of the equipment we were better able to make additional selections of digital imaging equipment for microscopes and purchases of equipment with the final \$10,304.18 are in process. An extension of the grant deadline was requested from Debbie Parker on May 06, 2005 and approval received on May 23, 2005

Evaluation

Use of the equipment for direct instruction, teaching material preparation, and to present information for practical laboratory exams has been successful. Use of projected images to instruct students in microscopy techniques has decreased student and instructor frustration and time needed for mastery in courses requiring microscopy competency. Production of improved images has made it possible to develop professional quality printed materials for course packets and for posting on course webpages.

Budget: \$30,248 funded

	Requested Budget	Expenditures	Expenditures in Progress (\$10,304.18 remaining)
LCD projectors (4)	\$7,996 (total for 4)	\$5,981	0
Computers	\$5,800 (total for 4)	\$5,742.8	0
Carts	\$756 (total for 4)	\$1,119.96 (carts)	0
		\$293.96 (castors)	0
Cameras and Accessories	\$5,196	\$3,656.75 (high resolution camera for microscope)	\$3,656.75 additional high res. camera
		\$1,613.63 (2 cameras, flash memory, tripod)	\$2,400 2 real-time cameras for microscope image projection
		\$746 Camera adaptors for microscope (x2)	
Microscope	\$8,000	\$712.30 Trinocular stereoscope	0
Shipping		\$77.42	0
Wolfvision VZ-8 plus DocCam	0	0	\$3,000
Recurring costs	\$2,500	0	\$1110 replacement projector bulbs (x3)
		0	\$150 replacement microscope bulbs (x4)
Total	\$30,248	\$19,943.82	10,316.75

Four trinocular compound microscopes requested in the original budget were purchased with a Lupton grant to upgrade department microscopes. This allowed for the purchase of a high resolution digital camera and imaging analysis software for use with microscopes. This camera was so superior for photomicroscopy that we plan to purchase an additional unit with remaining funds.

Submitted by Becky Bell and Tim Gaudin