

Contact: Patrice Sayre

UNIVERSITY OF IOWA EQUIPMENT PURCHASE

Action Requested: Consider approval for the purchase of a JEOL JEM-2100F Field Emission Transmission Electron Microscope (FETEM) – total \$1,400,000.

Executive Summary: The University of Iowa requests approval to proceed with the purchase of a FETEM for the Central Microscopy Research Facility (CMRF).

Description of Equipment

The FETEM is a critical instrument for scientific and biomedical research especially for several emerging and increasingly important fields such as nanoscience, nanomedicine, and structural biology. It will be housed in room 84C of the Eckstein Medical Research Building, managed by the Central Microscopy Research Facility (CMRF) staff, and available 24/7 to all university investigators with a need to use it.

Justification of Need for Equipment

Currently there are two transmission electron microscopes (TEM) available for research and both are located in the CMRF. These lower-resolution TEM's make it difficult for researchers to collect images and chemical compositions at extremely high magnifications.

The new microscope is capable of increasing images fifteen million times which is five times better than the current transmission electron microscopes. For comparison, a conventional light microscope magnifies a specimen about one thousand times. This extremely high magnification provides for high spatial resolution and ultra-sensitive elemental analysis essential for nanoscience and structural biology studies.

There are 105 faculty labs from 34 departments and 8 colleges that use CMRF transmission electron microscopes in their research. This group has a total of \$74,115,761.00 in external funding this year.

Each of the following study areas require a magnification six to ten million times to view the specimens in question, making the JEOL JEM-2100F FETEM an absolute necessity for University researchers:

- ◆ Investigators in Chemistry, Physics, Internal Medicine and Occupational Health will use the FETEM to study the potentially harmful effects of manufactured nanomaterials on the environment and human health.
- ◆ Faculty in Pediatrics, Anatomy, the Cancer Center, Internal Medicine, Chemistry and Urology will use the FETEM for detailed characterization of specific proteins on virus and other vectors to target cell surface molecules for enhancing the efficiency of gene transfer and drug delivery.
- ◆ Faculty research in Biochemistry, Internal Medicine, Pediatrics, the Neurosciences, Anatomy and Cell Biology, Physiology, Microbiology and others need the FETEM to participate as part of the National Institutes of Health's strategic initiative the "Structural Biology Roadmap" establishing an inventory of the shapes of the proteins in the human body. Proteins are essential for cell function and if the shape of one or more proteins is in error, there may be serious consequences as in Cystic Fibrosis, Muscular Dystrophy, Adult-onset Diabetes, Huntington's disease, Parkinson's and Alzheimer's disease.

Any Known Alternatives to the Equipment Proposed

The University reports that Requests for Proposals (RFP) were solicited for a field emission transmission electron microscope. Two of the four vendors submitted proposals and JEOL submitted the proposal that was determined by the evaluation committee to be the best value. Evaluation criteria included instrument specifications, cost, demonstrated expertise in the field of FETEM and CMRF staff training opportunities.

Estimated Cost and Source of Funding

The cost for the FETEM is \$1,400,000. Sources of funding include a \$1,000,000 Carver Trust grant from the University of Iowa Foundation; \$300,000 from the Office of the Vice President for Research; and \$100,000 from the Carver College of Medicine.

Board Policy:

Chapter 7.05B(12) of the Regent Policy Manual requires that:

- ◆ Equipment costing more than \$1,000,000 must be submitted to the Board for approval; and
- ◆ Requests submitted to the Board Office for approval must include the following information:
 - ◆ Description of the equipment;
 - ◆ Justification of the need for the equipment;
 - ◆ Any known alternatives to the equipment proposed; and
 - ◆ Estimated cost and source of funding.