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**Federal funding provides national scope to Virginia Tech project  
to increase availability of knowledge on the Internet**

(Blacksburg, Va.) Within a very few years, the results of hundreds of thousands of current research projects and scholarly studies will become available on the Internet.

Virginia Tech's effort to train the next generation of scholars to use electronic communication resources, and to develop software for electronic publication and retrieval of theses and dissertations, will be supported by the U.S. Department of Education Fund for the Improvement of Post Secondary Education (FIPSE), announced John Eaton, associate provost for graduate studies at Virginia Tech.

"The whole scholarly research enterprise suffers because, despite students' considerable investment in the generation of theses and dissertations, access to them as printed documents housed around the country is severely constrained, greatly limiting possibilities of knowledge transfer," says Gail McMillan, director of scholarly communications in Virginia Tech's libraries.

The problem is that although there are approximately 400,000 master's or doctoral degrees awarded nationally each year, many students are poorly prepared for a career in which electronic publishing and access to networked information systems will be commonplace, says Edward Fox, project director, who is a professor of computer science and associate director for research at Virginia Tech's computing center.

"The project ... will be of great benefit to the academic community and to scholars across the country." says Congressman Rick Boucher.

The federally funded project will begin Sept. 1, however Virginia Tech has been working to create a regional electronic library since 1993 with the Southeastern Universities Research Association (SURA) and Southeastern Library Network (SOLINET). IBM donated a digital library computer system valued at \$250K in December 1995.

Earlier this year, SURA provided funds to begin dissemination of Virginia Tech's methods and technology in the southeast so that theses and dissertations can be prepared and submitted in electronic form, allowing them to be easily cataloged,

indexed, archived, searched, accessed, browsed, and re-used via the Internet.

With the federal funding, Virginia Tech will extend its education efforts to more than 40 institutions nationwide. Tech's researchers will develop a National Digital Library of Theses and Dissertations, coordinating operations of computer servers so that graduate students, faculty, and others engaged in scholarship or technology transfer can search, browse and retrieve the full-form of electronic theses and dissertations (ETDs).

"This project should help improve education in all graduate programs by making recent graduate research results instantly accessible, and launching a large, self-sustaining, digital library of ETDs," says Fox.

"Virginia Tech's theses and dissertation digital library elevates the fields of research and scholarly studies by enabling people to access information, when and where they need it," says Larry Bowden, director, Interactive Enterprise, IBM Software. "IBM is pleased to play a part in this exciting project through its IBM Digital Library solution."

Beginning Jan. 1, Virginia Tech's graduate students will be required to submit their final research electronically, so there is no turning back on this effort!

"For students, the electronic thesis or dissertation is easier and cheaper to prepare, simpler to distribute to reviewers in the draft stage as well as when completed, and more flexible in format," says Eaton. "And it encourages greater creativity and expressiveness on the part of the author by permitting inclusion of hypertext links and multimedia elements."

Presently, the university's students submit their documents as Portable Document Format (PDF) files, which can be created using software on Windows, Macintosh, or UNIX systems. PDF files can be moved across different computer platforms and operating systems and retain all their formatting. The electronic documents look like the paper copy; and a paper copy can be printed from the PDF file. Use of PDF costs the students nothing; the Adobe Acrobat Reader software that is necessary to read the document is free and may be downloaded from the Internet. Computer users can visit Virginia Tech's library on-line and search and browse the students' electronic documents.

The Virginia Tech researchers also are creating tools to allow students to submit electronic theses and dissertations in Standard Generalized Markup Language (SGML), so that they can be enriched through the use of hypertext - to link them to source material, for example, and can include multimedia components, such as sounds or video. SGML documents are easier to archive, search, and reuse (e.g., to copy an entry in a bibliography, or to test a new hypothesis using the data and model in a spreadsheet),

and therefore are more valuable to scholars, says Fox.

Other universities will test the software as it is developed. The Virginia Tech team has already begun training graduate school, library and computing center staff from: Auburn U., Clemson U., NC State U., U. Georgia, U. Virginia, and West Virginia U. Support has been promised by U. Utah. Other universities interested include: Florida Institute of Technology, MIT, U. Delaware, U. Pennsylvania, and William and Mary.

Principle investigators are Eaton, Fox, and McMillan. Neill Kipp, doctoral candidate in computer science, is technical manager. Fox also directs NSF-funded research to create local, national and international digital libraries; and to develop effective and efficient techniques for information storage and retrieval involving library catalogs, bibliographic and full text databases, and multimedia collections.

Says McMillan, "This should push forward the revolution in electronic scholarly publishing with universities playing a more active and cost-effective role in the production, organization, preservation and dissemination of knowledge." In addition to offering quicker access to research, she points out that libraries will save on the cost of binding, circulating, and shelving and reshelving documents.

FIPSE funding begins Sept. 1 with \$69,762 for the first year. Anticipated funding for years two and three is \$69,337 and \$68,941 for a total of \$208,040. Virginia Tech will provide institutional support in the amount of \$182,417 or 46.7 percent of project costs. SURA will provide at least \$30,000 additional in-kind support.

Adobe Systems Inc. has promised special support for the project, including a donation of software to the first 20 universities engaged in pilot testing. University Microfilms, Inc. (UMI), which has an archive of about 1.3 million theses and dissertations, is now accepting ETDs and is planning to provide electronic access; it continues its support of the Virginia Tech effort that began at a workshop UMI ran in 1987.

Additional support for this project has been promised by a number of other organizations including: ACM, Council of Graduate Schools, Coalition for Networked Information, Cornell Digital Library Research Group, Conference of Southern Graduate Schools, OCLC Online Computer Library Center, State Council of Higher Education for Virginia, SOLINET, SURA, and the Virtual Library of Virginia.

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**additional information is available on-line at <http://etd.vt.edu/etd/>  
see also <http://scholar.lib.vt.edu> for more information about digital libraries  
and what Virginia Tech is doing**

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