

## Graduate Pavements Program

*By Ann Overton, Public Affairs Manager, Virginia Transportation Research Council*

The quality of the pavement we drive on is more than skin deep – actually it's about 18 to 24 inches deep, depending on the road. And the structural integrity of this roadbed "skin" is vital to our transportation system and our economy.

Research conducted by the first two students to complete the department's new **graduate pavements program** could help ensure this integrity and provide Virginia's interstates and other roads a longer service life, while advancing the practice of forensic pavement analysis.

Derek Guthrie (Spring '07) and Javed Alam (Fall '07) both focused their master's research on the use of the falling weight deflectometer, or FWD, a device that employs a non-destructive method to analyze a pavement's subsurface integrity. The FWD applies a load to a spot of pavement to measure the deflection – or how much it moves – at various points from the center of the load.

Data from the falling weight deflectometer help engineers ascertain the structural capacity of the entire pavement depth and its remaining service life without drilling small cores every few hundred feet along the road. This process is thus quicker and less damaging to the pavement, and it reduces inspection time on the roadway, saving drivers time and money by trimming traffic delays caused by road closures.

Derek's thesis modeled the structural responses of hot-mix asphalt, a flexible pavement that is very responsive to heat, cold and loads, using the falling weight deflectometer. Javed developed a methodology for using the FWD for network-level testing, such as the entire length of Interstate 81 in Virginia.



**VTRC Research Scientist and U.Va. Visiting Faculty member Shabbir Hossain with current graduate student Benjamin Schmidt**

The graduate pavements program, created in 2005, is a joint effort of the Department of Civil and Environmental Engineering and the Virginia Transportation Research Council; the Council is a 60-year partnership of the Virginia Department of Transportation and U.Va., created in 1948 and located on Observatory Hill on the U.Va. grounds. The Center for Transportation Studies, within the CEE department, and the Research Council both saw that such a program would complement the existing graduate curriculum in transportation engineering and management.

Nationally known Ph.D.-level scientists from the Research Council – experts in pavements and pavement materials, structures and geotechnical engineering – comprise the faculty for the graduate pavements program. The Council's

researchers have advised and taught U.Va.'s transportation graduate students for years. This new teaching program has taken that partnership to a new level of cooperation by increasing the Center's course offerings and providing students with the chance to work on even more cutting-edge research.

Another current pavements graduate student, Amy Hearon, is focusing her master's research on the innovative warm-mix asphalt technology in conjunction with Research Council scientists. Warm-mix asphalt, a potentially economical alternative to traditional hot-mix asphalt, is popular in Europe and was introduced in the United States about five years ago, where transportation agencies are still studying its benefits. Warm mixes, which don't require higher production temperatures at the plant and during installation, can help reduce greenhouse gases and fuel costs during production and provide for longer paving seasons as well as more durable pavements.



**Visiting Assistant Professor Brian Diefenderfer inspects core samples with U.Va. graduate students Amy Hearon and Bryan Smith**

Lester A. Hoel, director of the Center for Transportation Studies and L.A. Lacy Distinguished Professor of Engineering, said, "With the addition of this graduate

pavements program, the Center for Transportation Studies has provided a comprehensive graduate-level transportation program with our long-time partner, the Virginia Transportation Research Council. This new program also ensures that U.Va. remains at the forefront in surface transportation education to equip our graduates with the knowledge they need to make immediate contributions to the transportation industry in Virginia and nationwide."

*More information about the graduate pavements program is available at [www.cts.virginia.edu/graduate.htm](http://www.cts.virginia.edu/graduate.htm); information about the Virginia Transportation Research Council is available at [www.vtrc.net](http://www.vtrc.net).*