

## ENGINEERING/TECHNOLOGY

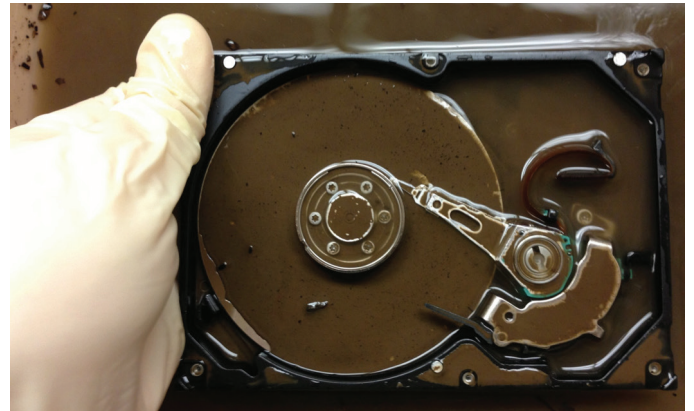
### Chemical Restoration of Damaged Hard Drives

Student researchers: Brian Curnett, Talin Darian, Kevin Wojcik, and Sean McCarthy, Seniors

There is currently no successful method for recovering data from a hard drive that has been severely damaged by biological or environmental elements. Creating a standard, repeatable, low-cost method for extracting data from a hard drive that has been severely damaged by smoke, freshwater, or saltwater would be beneficial to many industries, agencies, and people. This study, lasting two semesters, dealt with finding an inexpensive way to repair damaged hard drives that can be repeated without the use of a clean room. Hard drives were damaged with a saltwater solution mimicking concentrations present in ocean water. Hard drives were immersed in water in order to prevent exposure to air, preventing the need for a clean room. Platters were then cleaned with a series of organic solvent rinses. Solvents used in the recovery were chosen based on effectiveness and cost when scaled to large recovery operations. The hard drives were then rinsed using ultrapure water. Afterward, the drives were reassembled while still immersed in water. Finally, vacuum evaporation was utilized to dry the hard drives. The hard drives were analyzed with computer forensic software to determine the percentage of data recovered. While the methods utilized showed success, there is still further research to be done to increase the usability and effectiveness of this procedure. Great potential shows that this could be used in the future to develop a system for a rapid response after severe natural disasters.

*Research advisor Samuel Liles writes, "The undergraduates involved in the chemical restoration of*

*the damaged and corroded hard drives project pushed the bounds of current scientific understanding using interdisciplinary techniques. They pulled together chemistry, physics, mechanics, and technology to produce a new solution to a real problem."*



A hard drive damaged by silt and then shown again after being cleaned with a series of organic solvent rinses.

Curnett, B., Darian, T., Wojcik, K., & McCarthy, S. (2014). Chemical restoration of damaged hard drives. *Journal of Purdue Undergraduate Research*, 4, 76. <http://dx.doi.org/10.5703/1288284315437>