

## Student Scientist Designs “Oil Eating” Cement to Combat Climate Change



**Above:** Chandler Harris making oil eating cement composite at Ecotek

Has your car ever had an oil leak? If so then you know what happens next- your driveway is littered with unsightly oil stains. To remove the oil stains can be difficult and in some cases, impossible. What’s more, the evaporation of hydrocarbons contributes to climate change. To address both problems simultaneously student scientist, Chandler Harris, a senior at Detroit Edison Early College of Excellence and lead researcher in civil engineering in Ecotek Lab, decided to design cement that “eats” oil.

This solution is more environmentally safe than washing the oil down the storm drain or adding toxic chemicals on the surface of cement to remove the oil stains. It is a “green” solution that takes advantage of organic cycles and processes in nature. Chandler got the idea for making this unique cement through conversations with Mr. Keith Young, founder and executive advisor at Ecotek Lab and from doing independent research on sustainable engineering related topics.

On August 4, 2015 Chandler traveled to Cambridge, Massachusetts to meet with Dr. Roland Pellenqu, a senior research scientist at the Massachusetts Institute of Technology (MIT) and co-innovator of a chemical recipe that reduces CO<sub>2</sub> emissions during the manufacturing of cement. While at MIT Chandler discussed ways to improve and measure the chemical properties of his cement. He also was able to do nano-fracture testing on one of his cement samples in the Multi-Scale Material Science Energy and Environment Lab.

This research project has been both challenging and rewarding for Chandler. He has learned how to apply his understanding of key chemistry and biology concepts. For example, he is learning how to culture and assess the remediation effectiveness of different strains of oil eating microbes as well as develop an appreciation of how quantum physics and computational mathematics are used in analyzing the biochemical properties of cement.

Over the coming months Chandler will continue perfecting his “oil eating” cement. He will also maintain his working relationship with Dr. Pellenqu. As Chandler enters his senior year in high school he has started preparing for the college admission process. MIT is on his short list of schools to apply to. With good grades (he has maintained a 3.7+ since the 6<sup>th</sup> grade), solid standardized test scores and a number of unique research experiences in the lab, Chandler is well positioned to compete for admission and academic scholarships in STEM at many of the nation’s top universities.



Fracture testing device in MIT lab



Chandler and Dr. Roland Pellenqu at MIT discussing quantum physics



Sample of oil eating cement and traditional cement

### About the Ecotek Science Program

Ecotek is a science research lab program for young inventors and researchers in grades 5 thru 12. Student scientists work on projects aligned with the issues being addressed by world leaders at the United Nations. To learn more about Ecotek Lab go to <http://www.ecotek-us.com>