

## Virtual Mini Explosives Camp (Summer 2021)

Because of the pandemic, Missouri University of Science & Technology (S&T) has decided to forgo its onsite summer offerings for summer 2021, opting instead for virtual summer camps. We in the S&T Explosives Program are using this opportunity to offer a virtual mini explosives camp to both continue and expand our tradition of explosives summer camps for the future. The virtual mini explosives camp provides a less expensive and easier option not requiring travel, opening it up to more participants, expanded age group (all high school students 14-18) and increased easy access (a spin-off of the pandemic).

**Cost** \$300

**Eligibility** High School students 14-18 years of age. Global eligibility, the Americas (North and South America)

**Time Frame.** The camp will comprise four (4) 3hr blocks straddling the July 4<sup>th</sup> holiday, June 28<sup>th</sup> – 9<sup>th</sup> July 2021. Tentative dates: Mon 28 June, Wed 30 June, Wed 7 July, Friday 9 July time 12-3pm CDST (Missouri time).

**Format:** We are anticipating Zoom will be used as it is a modern platform, easy to use that most youths have experience with, and is widely used at S&T. This allows attendees the flexibility to participate from home or any other location of their choice where there is at least medium speed internet and 2Mbps bandwidth download from the US.

**Registration:** Handled by S&T Professional & Continuing Education

**Contacts:** University: Michelle Pipes (michellpipes@mst.edu), Explosives Program: Paul Worsley (pworsley@mst.edu)

**Topics** to be covered include: Intro to the S&T Explosives Program and offerings, uses of explosives, careers in explosives, explosives blasting in mining, explosive demolition, explosive chemistry, display fireworks, setting up a fireworks show, pyrotechnics, explosive research producing nano diamonds and other nano materials, demonstrations of high speed cameras and explosions, explosive engraving, Explosives Ordnance Disposal (EOD) and using a huge black powder cannon for impact research, as a sample.

Although you can't do hands on with explosives and get your hair blown back like our pre-Covid onsite explosives camp, we are going to cover exciting subjects, many with Wow! Factor to make both a rounded educational and engaging experience. There will also be some projects to work on over the July 4<sup>th</sup> holiday, one of which will include going to see a fireworks display.

**Camp Director:** Professor Emeritus Dr. Paul Worsley. 40+ years of experience in explosives, pyrotechnics and propellants with a very long list of academic achievements. Immediate past director of the S&T explosives program (built it) and experimental mine (retired Sept 2019). Two International Society of Explosives Engineering awards. Many TV and new media appearances including hosting the Discovery Channel's "The Detonators" TV series. Licensed blaster, pyrotechnician and display fireworks operator in the state of Missouri, past examiner for the state blasters certification. Director of 34 previous hands

on weeklong explosives camps. In partial retirement he still teaches one explosives class a semester and directs explosives camp.

**Other Camp instructors:** The dream team made of top people in their fields including Dr Kyle Perry (current Director), Dr. Catherine Johnson (in charge of our Energetics Research Facility), Jerry Vaill MS Explosives Engineering, BS Civil Engineering (one of our Pyrotechnics instructors who is lead pyrotechnician for the Kansas City Chiefs) and assisted by various graduate students studying for advanced explosives degrees, plus let's not forget the local US Army EOD.

### **About the Missouri S&T Explosives Program**

Missouri S&T has a rich tradition of teaching the use of explosives starting 150 years ago at its inception as the Missouri School of Mines (MSM). Although for many years there has been a considerable track record of research and teaching of explosives at our university, there has been a rapid expansion of explosives offerings since 1995 pushed and developed by Dr. Worsey, with the offering of minors of explosives engineering in 2005 and popular explosives certificates for professionals in 2006, both the first of their kind. In 2010 a Masters in Explosives Engineering was launched, and as a result classes obtained the explosives engineering (Exp Eng) designation and with it, full academic program status. The Masters was followed by a PhD in Explosives Engineering in 2014, and a Masters in Explosive Technology in 2018 for non-engineering students. To date over 100 explosives masters have been conferred and over 200 explosives certificates awarded. At the present time over 20 separate explosives lecture and lab courses are offered by both full time and adjunct faculty including several instructors working in industry. Courses are both given onsite to traditional students and offered distance to industry and government employees. We started the first summer explosives camp in the Americas if not the world with 34 summer camps successfully completed to date. The camp is a hands on, a one of a kind five-and-a-half-day camp whose standard no other university has ever even approached.

This virtual camp has be designed to compliment the traditional on site hands on camp which because of explosives handling has a more restricted application process due to US government regulations concerning the "possession" of explosives.