

FOR IMMEDIATE RELEASE
Friday, May 18, 2012

Contact: NIDA Press Office
301-443-6245
media@nida.nih.gov

Optogenetics project takes top NIDA Addiction Science Award

Connecticut teen's exploration of the prefrontal cortex impresses NIH judges

A project that maps dopamine circuits in the prefrontal cortex through optogenetic manipulation was given top honors in this year's annual [Addiction Science Awards](#) at the 2012 Intel International Science and Engineering Fair (ISEF)—the world's largest science competition for high school students. The awards were presented by the National Institute on Drug Abuse (NIDA), part of the National Institutes of Health, and Friends of NIDA, a coalition that supports NIDA's mission. The Intel ISEF Addiction Science Awards were presented at a ceremony Thursday night at the David L. Lawrence Convention Center in Pittsburgh.

First place distinction went to John Edward Solder, a senior at Staples High School in Westport Conn., for his project, Optogenetic Interrogation of Prefrontal Cortex Dopamine D1 Receptor-Containing Neurons as a Technique to Restore Timing: A Novel Approach to Treat Prefrontal Disorders. The 18-year-old was able to specifically control behavioral timing in mice that were genetically modified to activate dopamine neurons in the prefrontal cortex, a region involved in higher order functions such as impulsivity and self-control, in response to a light stimulus. His research, which provides another example of the power of optogenetics (a technique that activates specific neurons just by shining light onto them) to modify neural activity in discrete brain areas at will, brings us one step closer to the development of novel therapies for a wide range of psychiatric disorders. He plans to attend Yale University in the fall.



2012 Addiction Science Award winners
from left: L. Elisabeth Burton, Benjamin Jake Kornick,
John Edward Solder, and NIDA's Dr. Susan Weiss

“This young scientist used optogenetics to directly activate dopamine neurons in the prefrontal cortex to influence behavior in the mouse, providing a proof of principle for an approach that could be used one day to restore disease-impaired functions in the brain,” said NIDA Director Dr. Nora D. Volkow. “His work highlights the versatility of the optogenetic technique for mapping out the circuits that underlie discrete behaviors and that are disrupted in brain disorders that involve the prefrontal cortex, including Parkinson's disease, addiction and schizophrenia. His impressive command of the principles, mechanics and implications of this promising technology should enable Mr. Solder to make significant and long-lasting contributions to the field of neuroscience.”

Second place distinction went to Benjamin Jake Kornick, a 17-year-old at Roslyn High School in Roslyn Heights, N.Y., for his project OMG: Look Who Joined Facebook! The Relationship between Parenting and Adolescent Risk Behaviors. He became interested in the prevention of hurtful online behaviors after being the target of cyber-bullying in middle school. For his project, he conducted a 74-item survey of more than 130 teens about their relationship with their parents as well as their risky behaviors online and offline. His detailed statistical analysis allowed him to construct a novel model of the complex relationships between parental knowledge and their children's undesirable or risky behaviors. The high school senior will attend Columbia University next year.

“In this new world of cyberspace and social networking, Mr. Kornick delved into highly nuanced and often overlooked aspects of the relationship between parents and their children,” said Dr. Susan Weiss, NIDA's head judge and acting director of the Office of Science Policy and Communications. “He determined that stricter control of teen activities online and parent-child closeness are the best predictors of their knowledge about what their child does while unsupervised. And yes, he recommends that parents ‘friend’ their teens’ Facebook pages.”

Winning third place distinction was L. Elisabeth Burton from Rio Rancho High School in Rio Rancho, N.M., for her study of body image in both boys and girls, and how it affects their perceptions and health behaviors, which she titled A Big Fat Deal, Phase III: Attributions of Body Talk, Risk Assessments of Steroid/Dietary Supplement Use, Perceptions of Media Images, and Self-Esteem. The 16-year-old sophomore became interested in body image when a friend committed suicide after a long battle with an eating disorder. Burton developed and conducted a survey of nearly 200 teenage boys and girls to determine how their internal self image and self esteem affected eating disorders, steroid use and potentially dangerous use of dietary supplements. While girls aspire to look “skinny” like fashion models and boys want to look “buff” like the athletes they see in magazines, few teens realized that many of the highly stylized body portrayals in the media are altered images, and are unrealistic to attain safely.

For the first time, the judges awarded an honorable mention, to 15-year-old Zarin Ibnat Rahman, a sophomore at Brookings High School in Brookings, S.D., for her project, Boosting the ADHD Brain: Effects of Gum Chewing and Caffeine on Cognition and Memory in Adolescents with ADHD. Based on recent brain imaging research, she hypothesized that the act of chewing may boost key aspects of cognition (e.g., memory and attention), and decided to test this hypothesis conducting a study of teens who have been diagnosed with ADHD. She tested the effects of chewing sugarless gum and/or caffeine (from dark chocolate) on their performance on a series of cognitive tests. Her results are consistent with the notion that chewing gum can improve attention and memory, although it did not appear to affect concentration.

Friends of NIDA provides funding for the awards as part of its ongoing support of research into the causes, consequences, and treatment of drug abuse and addiction. “We are thrilled at the broad range of research topics explored by the students this year,” said Dr. William Dewey, Louis S. and Ruth S. Harris Professor and Chair, Department of Pharmacology and Toxicology, Virginia Commonwealth University, Richmond, and president and chair of the Executive Committee, Friends of NIDA. “From optogenetics to Facebook, these young winners really

showcase the breadth of addiction science. By sponsoring this competition, Friends of NIDA hopes that these bright students will be encouraged to pursue a career in drug abuse research.”

This year, about 1,500 students from 70 countries participated in the Intel ISEF competition, coordinated by the Society for Science and the Public. The nonprofit organization Society for Science and the Public partners with Intel—along with dozens of other corporate, academic, government and science-focused sponsors—to provide support and awards each year. Winners receive cash awards provided by Friends of NIDA, with a \$2,500 scholarship for the first-place honoree. NIDA has developed a special section on its website, which includes other resources on addiction science, to highlight the winning projects and to help science fair entrants understand the criteria for the awards: [The NIDA Science Fair Award for Addiction Science](#).

###

The National Institute on Drug Abuse is a component of the National Institutes of Health, U.S. Department of Health and Human Services. NIDA supports most of the world’s research on the health aspects of drug abuse and addiction. The Institute carries out a large variety of programs to inform policy and improve practice. Fact sheets on the health effects of drugs of abuse and information on NIDA research and other activities can be found on the NIDA home page at www.drugabuse.gov, which is now compatible with your smartphone, iPad or tablet. To order publications in English or Spanish, call NIDA’s *DrugPubs* research dissemination center at 1-877-NIDA-NIH or 240-645-0228 (TDD) or fax or email requests to 240-645-0227 or drugpubs@nida.nih.gov. Online ordering is available at <http://drugpubs.drugabuse.gov>. NIDA’s media guide can be found at <http://drugabuse.gov/mediaguide/>, and its new easy-to-read website can be found at www.easyread.drugabuse.gov.

About the National Institutes of Health (NIH): NIH, the nation’s medical research agency, includes 27 Institutes and Centers and is a component of the U.S. Department of Health and Human Services. NIH is the primary federal agency conducting and supporting basic, clinical, and translational medical research, and is investigating the causes, treatments, and cures for both common and rare diseases. For more information about NIH and its programs, visit www.nih.gov.

NIH...Turning Discovery Into Health