

TEACHERS INCORPORATING INTELLECTUAL PROPERTY INTO K-12 CURRICULA

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The United States Patent and Trademark Office (USPTO) conducted its 4th Annual National Summer Teacher Institute (NSTI) on Innovation, STEM, and Intellectual Property July 16-21, 2017, in Denver, Colorado. Over 50 teachers from across the nation were selected to take part in the program, which was offered in collaboration with the University of Denver's Project X-ITE Team — a catalyst for the intersection of innovation, technology, and entrepreneurship.

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PROGRAM BACKGROUND

NSTI is a week-long innovation and entrepreneurial boot camp focused on science, technology, engineering, and mathematics (STEM) and intellectual property (IP) principles for K-12 educators. It is

open to elementary, middle, and high school teachers from across the nation in an effort to help inspire and motivate America's young innovators, entrepreneurs, and "makers." Led by the USPTO's Office of Education and Outreach, the program is designed to introduce concepts of IP protection, innovation, entrepreneurship, and STEM to elementary, middle, and high school teachers in order to incorporate the concepts of making, inventing, and innovation into classroom instruction. The purpose of NSTI is to help teachers harness the innovative potential of their students in order to make American students more competitive and improve the lives and opportunities available to people across the U.S. The methods used in the program include experiential training tools and practices as well as project-based learning models.

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IP AND INNOVATION CONCEPTS

The central focus of this year's institute was on the creation and protection of IP, which includes inventions, knowledge discovery, creative ideas, and expressions of the human mind that may have commercial value and are protectable under patent, trademark, copyright, or trade secret laws. IP was modeled as both a teaching and learning platform to help inspire and motivate student achievement in STEM disciplines, computer science, and other fields of study such as innovation and entrepreneurship.

TEACHER ACTIVITIES

Teachers at this year's institute learned about patents, trademarks, copyrights, and trade secrets and took part in a wide range of specially designed, hands-on activities ideally suited for teaching youth about IP, innovation, and entrepreneurship. Teachers collaborated to seek innovative solutions to a broad set of problems ranging from food and cooking to sports, design, and saving planet Earth. Teams were supported by IP subject matter experts from the

USPTO and innovation professionals from industry, academia, and government agencies. At the culmination, teams pitched their inventions to a panel of esteemed judges led by Molly Kocialski, director of the Rocky Mountain Regional Office in Denver, Colorado. The week concluded with a field trip to the National Renewable Energy Labs in Golden, Colorado, where teachers got a special tour of the labs and shared opportunities and strategies for implementing the skills and knowledge they learned at NSTI to further inspire student learning about IP, innovation, and entrepreneurship.

SPEAKERS

Distinguished speakers at this year's institute included notable inventors, entrepreneurs, and representatives from nonprofits, education, and the private sector.

- Steve Katsaros, CEO and founder of Nokero
- Jacquelyn Ros, CEO and founder of Revolar
- Ruthe Farmer, chief evangelist at the Computer Science for All Consortium



Figure 1. Teachers work on hands-on activities at the 2017 National Summer Teacher Institute. *Photo courtesy of USPTO.*

- Steve Davee, author, educator, and “Maker” evangelist
- Mark Miano, executive editor from NBC Learn
- Avis Frazier-Thomas, vice president and intellectual property counsel for Warner Brothers Entertainment
- Dr. Richard Charles, STEM director for the Cherry Creek School District, Colorado
- Eric Payne, senior licensing executive at the National Renewable Energy Laboratory
- Dr. Leslie Flynn and Dawn Bowlus, University of Iowa Jacobson Institute for Youth Entrepreneurship

SPOTLIGHT ON DOUG SCOTT

Doug Scott attended NSTI in 2014 and served as a teacher ambassador at this year’s institute. He currently heads the Department of Technology and Engineering for Hopkinton Public Schools in Massachusetts and teaches engineering and robotics to students at Hopkinton High School.

Doug is also a master teacher in the Lemelson-MIT Program, which awards grants to schools each year to help students and their teachers use innovation and invention to solve problems in their communities. Doug helps teachers apply for the grants, and he assists them and their students throughout the invention process.

Doug decided to apply to attend the NSTI after working with a group of students who were submitting a patent application. He wanted to help them and become more knowledgeable about inventions and patents, and NSTI presented the perfect opportunity. Today, Doug has made what he learned at NSTI part of his curriculum.

“When you add invention to the mix, it brings something unique for students. When you bring in IP, it makes them think in a different way. When you have a student identify a problem, develop a solution and determine how to protect and market it, it makes them think about the whole innovation and entrepreneurship process.”



Figure 2. Teachers work on hands-on activities at the 2017 National Summer Teacher Institute. *Photo courtesy of USPTO.*

In 2014, Doug's Natick High School Lemelson-MIT InvenTeam filed a patent application for their ice search and rescue vehicle. The team presented their invention to President Obama during the 2014 White House Science Fair. Through Doug's efforts, that same year, he received the Massachusetts STEM Teacher of the Year Award. In December 2016, the Natick team was issued U.S. patent 9,511,833 B2. At this year's NSTI, Doug was joined by his former student Ford Grundberg, now Airman 1st Class in the U.S. Air Force, who shared a powerful and emotional story about how his experience as a student inventor under the tutelage of Doug Scott changed his outlook on life.

SPOTLIGHT ON YOLANDA PAYNE

Yolanda Payne is a media specialist at H.B. Stroud Elementary School in Athens, Georgia, and attended NSTI in 2015. During her time at NSTI, Yolanda appreciated the opportunity to be around like-minded people. "When you are an educator, it can be isolating because you go into your classroom or office and focus on your area. Through NSTI, I was able to meet other educators who are as passionate about their students' learning as I am."

One activity the teachers participated in was an Invention Challenge, in which they were divided into teams to create an invention that was commercially viable or useful. Yolanda's team created a product they named the Maker Mod, a cabinet with a table that can be folded up or down with different shelving options. The team has kept in touch after NSTI and even filed a provisional application for a patent on their project.

With her new perspective, Yolanda has used what she learned at NSTI to make some tangible changes at

her school. For example, she has added maker spaces to her library — areas where students can tinker and create. Maker spaces have no instructions. They are organic environments where students can be creative. At a school with over 400 students, located in a county with one of the highest rates of poverty in Georgia, it is imperative to expose kids to making and let them see themselves as makers, innovators, and inventors — as producers, not just consumers. This leads to creating a safe space for students, where they are comfortable asking questions and they are open to possibilities.

Today, Yolanda encourages her students to ask questions. Growing up in a large family in rural Mississippi, she understands the attitude some students have that they should be quiet and make do in school. She wants her students to feel empowered and realize that they are full of possibility, despite their circumstances, just as she was.

This year, Yolanda hopes to introduce an Invention Convention to her school. She wants kids to realize the validity of their ideas and understand that innovation and invention do not have to cost a lot. A notebook, gel pens, and colored pencils are often all that is needed to get started.

FUTURE WORK

The USPTO will soon be planning the 5th Annual National Summer Teacher Institute, including dates and location. Please visit the NSTI website (<https://www.uspto.gov/learning-and-resources/outreach-and-education/national-summer-teacher-institute>) for more detailed information regarding National Summer Teacher Institute, eligibility requirements, and selection process.