

youth currently participate in robotics clubs, citizen science teams, and water quality monitoring efforts. Minnesota 4-H Aquatic Robotics brings all three of these project areas together using SeaPerch technology as the “on ramp” from an interest in robotics and engineering to community water issues.

The University of Minnesota’s Extension Center for Youth Development offers the 4-H Aquatic Robotics program which builds the capacity of young people to make a difference in their community. This is accomplished by providing education, early detection and monitoring of designated aquatic invasive species in selected waters.

YOUTH SCIENTISTS IMPACTING THE FUTURE

Robotics. Aerospace. Alternative energy. Engineering. Environmental science. Agri-science. Veterinary science. These are just a few of the programs that 4-H youth participate in everyday and learn new skills that make a difference in our communities. 4-H’ers are using aquaculture to raise fresh vegetables and seafood. 4-H youth are winning international rocketry competitions and using GIS technology to map a section of the Appalachian Trail. Our hands-on programs empower youth and provide them with opportunities to grow, learn, and become confident kids.

ONE MILLION NEW SCIENTISTS. ONE MILLION NEW IDEAS.

The United States is falling dangerously behind other nations in developing its future workforce of scientists, engineers, and technology experts (Lerner, Lerner, & Phelps, 2008) (Provasnik et al,

2012). To ensure global competitiveness, we must act now to prepare the next generation of STEM leaders. 4-H has met the goal of engaging one million new scientists through STEM 4-H projects and the annual National 4-H Youth Science Day.

WHAT IS STEM?

For more than a century, 4-H has engaged youth in science, technology, engineering, and math (STEM). This has traditionally meant a solid focus on agricultural science, electricity, mechanics, entrepreneurship, and natural sciences. Today, 4-H has grown to include rocketry, robotics, bio-fuels, renewable energy, computer science, environmental sciences, and more. 4-H Science, Engineering and Technology provides hands-on learning experiences to encourage learning about the world around you in partnership with adults that care about your learning and are crazy about STEM.

4-H STEM allows you to work on your questions, design your own tests, create your own models, build your understanding, and share your work with others. That’s what science and engineering are, trying to understand the natural universe and develop solutions to the problems faced in our world today.



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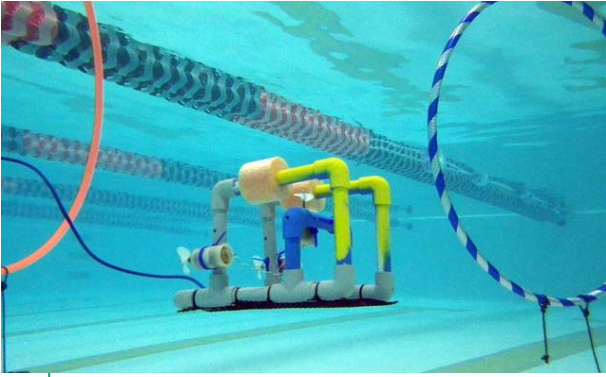


4-H Aquatic Robotics Program!

Learn about robotics, engineering, science & mathematics while building an underwater ROV!

UNIVERSITY OF MINNESOTA
EXTENSION





Learn science, technology, engineering and math skills to design and build your own ROV, then adapt it to monitor the water quality of local lakes and rivers. Solve scientific questions by designing and carrying out real experiments. Learn about biology by testing the water and observing nearby habitat. Learn about physics through buoyancy and electrical wiring.

Minnesota's surface water area is one of the greatest in the nation and the state contains a three-way continental divide watershed with flowage from Minnesota going North to Hudson Bay, East to the St. Lawrence River, and South to the Gulf of Mexico. Minnesota rural and urban communities have a distinct and compelling opportunity to engage more youth citizens in stewardship of water resources and water monitoring.

WHAT IS A SEAPERCH ROV?

The SeaPerch is a remote operated vehicle developed by MIT Sea Grant and the Society of Naval Architects and Marine Engineers (SNAME). It is a tool that youth can build,

adapt, and then navigate through underwater challenges. Once youth successfully design and construct their SeaPerch, they will use it in local watersheds, along with faculty, adult volunteers, and water resource partners as mentor guides, to explore and learn about Minnesota's waters.



SeaPerch offers a simple, interactive platform that allows students to learn about myriad subjects. By designing and building their own remotely operated vehicle (ROV), students can learn about engineering. By conducting water sampling and observing habitat, they learn about biology. They learn about physics through buoyancy and electrical wiring; and they learn about history and so much more by studying the evolution of ocean exploration.

Young people who participate in informal, out-of-school time science programs like Minnesota 4-H Aquatic Robotics learn scientific and



mathematical concepts, strengthen their ability to think like scientists, develop skills using related language and tools, and gain positive attitudes about science and self. Through Minnesota 4-H

Aquatic Robotics youth have the opportunity to become more civically-engaged and scientifically-grounded. Many of today's most difficult challenges require both innovation and a scientific approach to address them in new ways. This project is designed to assess the power of combining an engaged and inquiring mind with new technology to generate real world solutions to real problems.

WHAT MINNESOTA IS DOING

Minnesota 4-H is working with the Office of Naval Research and their SeaPerch program. Youth will be trained in making the SeaPerch and working with an adult begin to monitor nearby lakes. Data will be shared with Lake Associations and other places.

THE 4-H AQUATIC ROBOTICS PROGRAM

The Minnesota 4-H Aquatic Robotics Program gives youth in 4-H clubs, camps and adventures the opportunity to apply underwater robotic technology to real world water issues through an inquiry-based science approach. Minnesota 4-H Aquatic Robotics will provide opportunities for youth to authentically engage with real world issues using ROV technology and, thus, build their identity as science learners. Minnesota 4-H

