

*The Square One Education Network, in partnership with the Great Lakes Water Studies Institute, Northwest Michigan College
Presents a unique professional development opportunity-
Intermediate Underwater Remotely Operated Vehicles:
"Going to Greater Depths"*



Workshop Overview

This workshop represents the next step in the underwater remotely operated vehicle (ROV) design and building progress. Its intent is to provide a resource for teachers who wish to integrate a higher degree of technology and sophistication into their ROV. Embracing the digital world requires a different thought process. Once the digital foundation is laid, a whole new avenue of motor control, communication and data collection is available for the ROV builder.

Currently little opportunity exists for engineering or applied science projects in the marine environment, especially at the high school level. The marine ROV building challenge truly offers some unique engineering challenges and design parameters that are not addressed in other land-based robotics projects.

Date: Friday November 16th, 9:00 am – 5:00 pm, and Saturday November 17th, 9 am – 3 pm

Location: Northwestern Michigan College, Traverse City, Michigan

Cost: \$100 per team (of one or two teachers)

Target Participants: 4th -12th grade educators in science, technology, engineering and mathematics or any other disciplines that have interest in mentoring and helping students integrate a greater degree of technology into their ROV.

Topics

Analog vs. Digital	Proportional Motor Control
Prototyping	Adding a Human Interface (joystick)
Motor controller interface	Controlling a robotic claw
Introduction to Microcontrollers (basic stamp®)	Sensor theory
Introduction to P-Basic Programming	Passive sensors
Microcontroller/Microcontroller Interface	Serial Liquid Crystal Display (LCD)

Best practice teaching topics such as classroom management, implementing project based education, the role of the mentor teacher and safety in the classroom will be woven throughout.

Additional Details: A maximum number of 8 teams, with each team made up of 1-2 educators from the same K-12 institution or ISD (16 total participants) and will be selected to participate in the workshop, based on:

- Previous ROV experience and a vision and willingness to implement greater ROV technology into the classroom or after school program
- Professional background, teaching experience, philosophy and leadership experience
- First preference will be given to schools and teachers that have demonstrated some level of integration of ROV building in their respective school



Presenters:

- Keith Forton, Traverse City Central Senior High
- John Velis, Traverse City Central Senior High
- Karl Klimek, Square One Education Network

Requirements and Expectations of Participants:

- Be a current faculty member of a K-12 educational institution
- Submit an application form for review and possible selection
- Demonstrate a willingness to return to their respective institution and integrate a higher degree of ROV technology into the curriculum either directly or indirectly (i.e. engineering club)
- Form a team of 1-2 teachers and participate as a team for the entire workshop
- Provide a letter of support from their principal or administrator
- Be willing to share what they have accomplished as a result of the workshop. This could be adapting lessons, unique engineering designs or innovative uses for the ROV.
- Acknowledge that all materials received in this workshop will become property of their respective school(s)

Lodging and Meals: If accepted, participants are responsible to make their own lodging arrangements. A working lunch will be provided Friday and Saturday afternoon with light snacks during the day.

Cost Share: \$100/team for registration and kit materials. Each team will leave with all electrical and prototyping materials used in the workshop. Workshop fees are **non-refundable**. Checks should be payable to the Square One Education Network (credit card payments are accepted at www.squareonenetwork.org).

Reach and Longevity: As a result of this workshop, participating teachers will be empowered with the skills and materials needed to bring their ROV construction and design to the next level of sophistication. Square One encourages participants to recruit teams of students to participate in the annual Underwater Innovative Vehicle Design competition with their student-built, digital ROVs.

Summary: The ROV engineering project has been a unique and viable platform from which to teach applied science, electrical and engineering concepts. It is hoped that participants will bring back to their schools the knowledge and skills to help students cross into the digital world and provide the foundation to design and build ROVs with greater functionality and technology integration.

Further Information: For additional information please contact Keith Forton, Traverse City Central Senior High at 231-933-8536, cell 231-499-1441, or fortonke@tcaps.net Please type **INT ROV workshop** in the subject line as to avoid accidental deletion.

*Intermediate Underwater Remotely Operated Vehicle Workshop
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Sponsored by the Square One Education Network with support from Great Lakes Water Studies Institute, Northwestern Michigan College

Participant Application

This workshop represents the next step in the underwater remotely operated vehicle (ROV) design and building progress. Its intent is to provide a resource for teachers who wish to integrate a higher degree of technology and sophistication into their ROV. **Space is limited.** A maximum of 8 teams, with each team made up of 1-2 educators from the same K-12 institution or ISD (16 total participants) will be selected to participate, based on the strength of their applications, including:

- Current activities and involvement mentoring or implementing ROV building with students.
- A future vision and willingness to implement advanced ROV technology into the classroom.
- Willingness to share with the group what they have accomplished during the year

Applicants should have experience mentoring students building ROVs, familiarity with the basic ROV electrical system (i.e. switch box, motors and power supply), and using small hand tools.

Please include each of the following components in your workshop application:

1) Applicant information (if attending in a team of two, be sure to include details for each applicant):

- Name
- Educational institution
- Mailing address
- Phone number and email address (email will be the primary form of communication)
- Current subjects taught, grade levels and class load

2) Educational Institution Information for each institution represented:

- Name of Institution
- Mailing address
- Principal
- Phone number and email address
- Brief description of the student population and demographics served by your school (grades, ethnicity, economic levels, urban, suburban or rural)



3) Why do you want to participate in this workshop?

4) What activities, involvement, or mentoring do you currently implement ROV building with students?

5) Application Deadline Friday October 19th (All applicants will be notified via email on or before Monday October 22nd)

Please submit your completed application via email to Barb Land, Square One Program Director (barb@squareonenetwork.org) and copy to Keith Forton (fortonke@tcaps.net), Traverse City Central High

Please include **INT ROV application** in the subject line to prevent accidental deletion. Questions pertaining to content should be directed to Keith Forton (school 231-933-8536, cell 231-499-1441)

Square One is a 501c3 non-profit educational grant funding organization that creates and funds powerful, relevant experiences for K-12 teachers and students that creatively integrate science, technology, engineering and math.
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