

The Square One Education Network in partnership with Michigan Technological University and with financial support from the Michigan Space Grant Consortium presents:

Building Underwater Remotely Operated Vehicles (ROVs) In the Classroom Workshop

~ 4-9pm, Nov. 12 and 9am-5pm, Nov. 13 ~
at Michigan Technological University, Houghton, MI

Workshop Presenter: Mr. Keith Forton, Physics Teacher, Traverse City Central High School. Mr. Forton has presented the ROV workshop throughout the Great Lakes region and has been hugely successful as a mentor for student ROV competition teams.

Workshop Overview: K-12 educators with an interest in hands-on science, technology, engineering and mathematics (STEM) disciplines are invited to attend this exciting 2-day workshop that provides a truly unique educational opportunity. Participants will receive an instruction booklet, materials and support to design, engineer and build a fully functional underwater remotely operated vehicle or ROV. STEM lessons, skills and activities presented in this workshop support the Michigan Merit Curriculum in science, math and technology.

Cost: \$150 per team of three (\$50/person) for workshop materials and instruction. *Each team will receive lessons, a fully functional ROV, control box, power source, and optical system valued at over \$1,000, Friday dinner and Saturday lunch.* All materials become the property of your school. Make checks payable to **Michigan Technological University** and mail to: Lori Witting, Div. of Teacher Education, Michigan Tech University, 1400 Townsend Dr., Houghton, MI 49931.



Lodging & Meals: Participants will be responsible for their own travel and lodging. Friday dinner and Saturday lunch will be provided. To reserve a hotel room, contact: Super 8 at 906-482-2240 (\$60/single or double) or Best Western Franklin Square 906-487-1700 (\$79/single through Nov. 5th).

SBCEU's and Graduate Credit Available: Teachers may earn 1.0 SBCEU (\$10) or 1.0 graduate credit (requires additional effort) from Michigan Tech University at no additional charge due to a stipend from Michigan Space Grant Consortium, Square One Education Network, and the Department of Civil & Environmental Engineering that will subsidize the entire cost. The official MTU 2010-11 tuition cost for one Michigan Tech Applied Science Education Graduate Credit for Residents and Non-Residents is \$431.

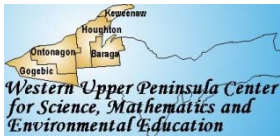
Space is limited to 8 teams of three participants for a maximum of 24 participants.

For More Information:

<p>For information on ROV Program: Barb Land, Project Manager Square One Education Network Email: barb@squareonenetwork.org Tel: 248-736-7537</p>	<p>For information on MTU workshop and local arrangements: Joan Chadde, Program Coordinator Western UP Math & Science Center Email: jchadde@mtu.edu Tel: 906-487-3341</p>	<p>Submit registration form, \$150 payment & MTU credit application to: Lori Witting MTU Div. of Teacher Education 1400 Townsend Dr., Houghton, MI 49931 Email: lori@mtu.edu Tel: 906-487-2460 Fax: 906-487-2468</p>
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This workshop is made possible by a grant from Michigan Space Grant Consortium and Square One Education Network

Coordinated by: Western Upper Peninsula Center for Science, Mathematics and Environmental Education,
▪ Michigan Technological University ▪ Square One Education Network



Building Underwater Remotely Operated Vehicles (ROV) in the Classroom Workshop

Summary: ROV engineering has been a unique and viable platform from which to teach applied science and engineering concepts, including aquatic studies. It is hoped that participants will bring back to their schools the knowledge and skills to actively engage students in real world learning and expose students to new career fields.

Capacity & Future Use: As a result of this workshop, 24 teachers will be gain the skills and materials needed to excite and engage students at their respective schools. Previous experience has shown that building an ROV can sustain approximately 30-students/year/school. In addition over 85% of the materials (camera, motors, etc.) used in the workshop can be recycled for use in future years.

Target Audience: Middle and high school educators in science, technology, engineering, and mathematics with an interest in aquatic investigations. A maximum number of 8 teams may participate per workshop (8 teams of 3 people from the same school, district or ISD). Apply soon!

During the ROV workshop participants will:

- Review lessons integrating ROVs into GLCES/ HSCES
- Build a fully functional small scale ROV and test its performance through a series of underwater challenges
- Gain an understanding of the unique challenges of the underwater environment
- Learn methods of propulsion and control in 3-D space; resolve issues of buoyancy and weight
- Acquire the knowledge, skills, and resources to mentor students in designing and building an ROV.
- Network with educators with similar interests and share "best practices" in teaching and instruction.
- Learn how to use the completed ROV to support other academic offerings (service learning, environmental science, social studies, etc.)

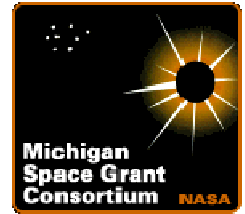
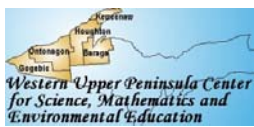
Potential Participants should:

- Be a current teacher, administrator, or staff of a K-12 educational institution
- Form a **team of three** from the same school, district or ISD and submit an application
- Be willing to share information and photos of what the team has accomplished after the workshop---adapting lessons, unique or innovative uses of the ROV across curriculum, etc.

To Apply:

- 1) Provide information for *each* team member (see attached application form)
- 2) Respond to Team questions on a separate page.
- 3) Get signature of each teacher's supervisor or school principal(s).
- 4) To register for one Michigan Tech graduate credit, complete MTU Non-Degree Graduate Application (<http://www.mtu.edu/gradschool/admissions/nondegree/>) and send with a copy of your current teacher certificate to Lori Witting via email: lori@mtu.edu or Fax: 906-487-2468.

Applicants will be notified of their acceptance via email by October 22, 2010 or earlier.



ROV Workshop Application ~ Nov. 12 -13, 2010

at Michigan Technological University, Houghton, MI

Please provide the following:

- 1) Provide information for each team member (see attached application form)
- 2) Respond to Team questions on a separate page.
- 3) Get signature of each teacher's supervisor or school principal(s) and \$150 payment.
- 4) To register for one Michigan Tech graduate credit - complete MTU Non-Degree Graduate Application (<http://www.mtu.edu/gradschool/admissions/nondegree/>) and send with a copy of your current teacher certificate to Lori Witting via email: lori@mtu.edu or Fax: 906-487-2468.

Teacher #1 Name: _____ Email: _____
First Last

Home Address: _____
Street City State Zip Code

Work Phone: (____) _____ Fax: (____) _____ Cell Phone: (____) _____

Name of School: _____

School/ Address: _____
Street City State Zip Code

Subjects Taught: _____ Grades Taught: _____

Degree(s) Earned/Areas of Teacher Certification: _____

I plan to take the workshop for: ____ 1 MTU graduate credit ____ 1.0 SB-CEU ____ I do not want credit.

Principal's name _____ Principal's email _____

Teacher #2 Name: _____ Email: _____
First Last

Home Address: _____
Street City State Zip Code

Work Phone: (____) _____ Fax: (____) _____ Cell Phone: (____) _____

Name of School: _____

School/ Address: _____
Street City State Zip Code

Subjects Taught: _____ Grades Taught: _____

Degree(s) Earned/Areas of Teacher Certification: _____

I plan to take the workshop for: ____ 1 MTU graduate credit ____ 1.0 SB-CEU ____ I do not want credit.

Principal's name _____ Principal's email _____

Teacher #3 Name: _____ Email: _____
First Last

Home Address: _____
Street City State Zip Code

Work Phone: (____) _____ Fax: (____) _____ Cell Phone: (____) _____

Name of School: _____

School/ Address: _____
Street City State Zip Code

Subjects Taught: _____ Grades Taught: _____

Degree(s) Earned/Areas of Teacher Certification: _____

I plan to take the workshop for: ____ 1 MTU graduate credit ____ 1.0 SB-CEU ____ I do not want credit.

Principal's name _____ Principal's email _____

Team Information (please attach your typed responses to the following questions to your application):

1. Why do you want to participate in this workshop?
2. How does your team foresee using the materials, information and expertise you will obtain from this workshop? Specifically, how will you use the materials to:
 - a. Impact learning in your classroom or school?
 - b. Support project-based learning in your classroom or school?
 - c. Support other classes across the curriculum?
3. Composition of the student population and demographics served by your school (grades, ethnicity, economic levels, urban, suburban or rural)
4. Include any other special features of your team, school demographics, geographic area or student population that would support your application.

Meals & Refreshments

Note any dietary preferences: ___ Vegetarian ___ Glucose intolerance ___ Lactose intolerance
___ Other. Explain: _____

We heard about this Institute from (check ALL boxes that apply):

- | | |
|--|--|
| <input type="checkbox"/> Friend, colleague | <input type="checkbox"/> Michigan Science Teachers Association |
| <input type="checkbox"/> Teacher or school administrator | <input type="checkbox"/> Professional organization: _____ |
| <input type="checkbox"/> Website: _____ | <input type="checkbox"/> List-serve: _____ |
| <input type="checkbox"/> Math/science center | <input type="checkbox"/> Other: _____ |

As a workshop participant, I agree to:

- 1) Fully participate in each day of the workshop.
- 2) Allow photos of myself taken during the workshop to be used in publications, electronic media, presentations, and demonstrations, and to use my name if pictures are published.
- 3) The release of my name, mailing address, and email address to other participants in the workshop.

Teacher #1 Signature _____ Date _____

Teacher #2 Signature _____ Date _____

Teacher #3 Signature _____ Date _____

Principal(s) Signature

The school/ISD will provide \$150/team (\$50/person) toward the cost of materials used in the ROV workshop. I understand that *all materials required to build one fully functioning ROV will become property of the school following the workshop.*

Principal #1 Signature _____ Date _____

Principal #2 Signature _____ Date _____

Principal #3 Signature _____ Date _____

Submit completed application via email by Friday, Oct. 22, 2010 to: (*put "ROV Workshop" in subject line)

Lori Witting Email: lori@mtu.edu Tel: 906-487-2460 Fax: 906-487-2468

Mail \$150 payment to: Lori Witting, Div. of Teacher Education, MTU, 1400 Townsend Dr., Houghton, MI 49931