MATE GLOBAL ROV COMPETITION:
Transforming Students Into Leaders, Innovators, and Entrepreneurs

Jill Zande - Associate Director, MATE Center
President/Executive Director, MATE Inspiration for Innovation (MATE II)

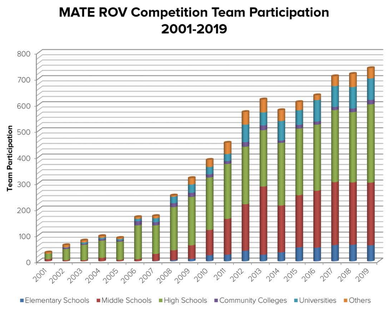
HISTORY & EVOLUTION

The MATE ROV Competition was created in partnership with the Marine Technology Society's ROV Committee to address marine technical workforce needs and raise awareness of ocean-related career opportunities. The program kicked off with a pilot regional event in 2001; the first world championship was held in 2002 with 22 teams from two countries (the U.S. and Canada).

Since that time, the competition has expanded both its reach (nearly 800 teams WORLDWIDE) and its mission – to inspire and challenge students to learn and creatively apply scientific, engineering, and technical skills to solve real-world problems and strengthen their critical thinking, collaboration, entrepreneurship, and innovation.

The MATE ROV Competition's vision is to build a community of learners, inspired by the ocean, innovating and collaborating to address societal challenges.

REFLECTIONS



Challenges

- ***Managing Growth:*** "Build it and they will come" - and they did, from around the world.
- ***Staffing:*** It takes the right people with the right skill sets to administer and sustain the program.
- ***Funding:*** It takes funding to hire those people and to meet the accelerated demand.
- ***Attracting and retaining community college participants:*** Students get hired before they make it to the competition - a good problem to have! Other challenges from a student and institutional perspective include limits of time, space (facilities and within the curriculum of program of study), and funding.

Lessons Learned

- ***It takes a lot of work.*** Don't underestimate the amount of work that it will take to grow and manage the program. Have enough people with the appropriate – complementary – skill sets. Identify and recruit volunteers.
- ***It may change course.*** Don't be afraid to let the project go in a new or different direction. Placing the competition in an entrepreneurial, business context took it to the next level and allowed it to attract a more diverse audience of students, volunteers, and sponsors.
- ***It will push your limits.*** Your program will often push students out of their comfort zones; it will push you, too!
- ***It will challenge you – let it.*** Surround yourself with people who will challenge you. This will help you to grow as the program does.

MATE ROV Competition Management Team

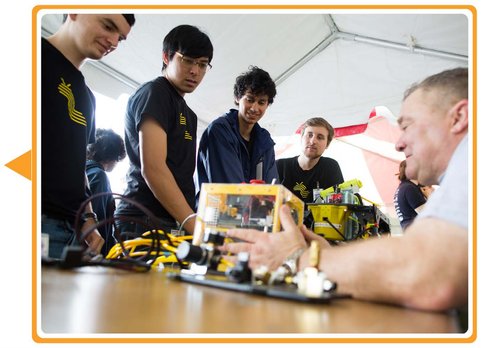
Jill Zande - Competition Director, MATE Center/MATE II
Matt Gardner - Competition Technical Manager, MATE Center
Timandra Sinclair - Competition Registrar & Team Liaison, MATE II
Scott Fraser - Technical/Safety Advisor, Long Beach City College
James Hotard - Lead Safety Inspector, Oceaneering International
Justin Manley - Chief Judge, Just Innovation
Rick Rudnick - Chief Judge, The Boeing company
Candiya Mann - Evaluator, Washington State University

And the thousands of other engineering, technical, and academic professionals who donate their time and technical expertise each year in support of the program

MATE · Monterey Peninsula College · NSF · MATE II

APPROACH

The MATE Global ROV Competition is an underwater robotics engineering challenge that engages thousands of students in grades 4-16 each year. Students work collaboratively to design and build an underwater robot to accomplish tasks based on real-world scenarios – from capping an oil well to installing a cabled ocean observatory, documenting a shipwreck, and tackling the ubiquitous problem of plastic pollution in our oceans.



MATE - Making Amazing Talents Emerge

The competition emphasizes and inspires a mindset of entrepreneurship and innovation by requiring students to transform their teams into "start-up" companies that, along with the ROV, produce technical reports, engineering presentations, and marketing (poster) displays. The students then present these products to working professionals who volunteer their time and technical expertise as judges. In addition to technical skills, the competition fosters the development of 21st century workplace skills, such as the ability to think creatively, innovate, problem solve, work as a team, communicate, adapt to changing situations, and manage a project, people, time, and money.

GLOBAL REACH

Each spring, more than 6,000 students in grades 4-16 participate in one of 40 (and growing) regional events that take place across the U.S. and around the world and feed into the world championship, which is held in June.

The competition is divided into four competition levels or "classes:" SCOUT (entry-level); NAVIGATOR (beginner-intermediate); RANGER (intermediate); and EXPLORER (advanced). This progressive structure complements the educational pipeline by providing students with the opportunity to build upon their skills as they engineer increasingly more complex technology for increasingly more complex tasks, allowing them to stay engaged and advance after they master each level.

SCOUT

NAVIGATOR

RANGER

EXPLORER

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MATE - Making Amazing Talents Emerge | https://materovcompetition.org

IMPACT

THE 2019 MAGNITUDE

STUDENTS ARE MORE INTERESTED IN MATH AND SCIENCE

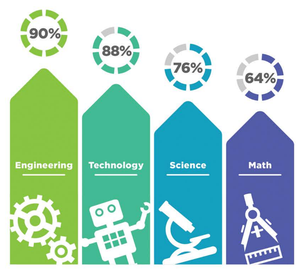
83% wanted to learn more about science, technology, engineering, and math

76% were more interested in a STEM career

"While [my students] might not realize it in the moment, the program offers them a real-world experience where they are able to develop both technical and essential skills."

- MATE ROV Competition 2019 Faculty Member

STUDENTS INCREASED SKILLS AND KNOWLEDGE



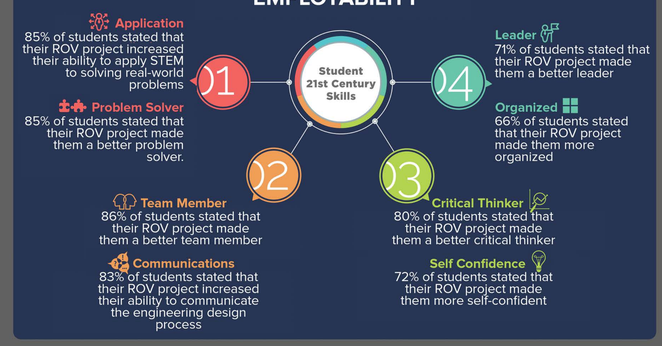
"MATE has transformed me from an introverted kid who had no idea what to do with his future to an extroverted, award-winning student in STEM, ready to tackle real-world problems."
- MATE ROV Competition 2019 Student

TEACHERS SAW IMPROVEMENTS IN STUDENT LEARNING

98% observed improvements in their students' STEM knowledge and skills

97% saw improvements in team building, critical thinking, and problem solving

EMPLOYABILITY



COMPETITION'S INFLUENCE ON STUDENTS' EDUCATIONAL AND CAREER PATHS

A 2015 survey of competition "alumni" included questions about their higher education, employment, internships, scholarships, and other opportunities that opened due to their involvement with the MATE ROV Competition. Highlights of the survey results included below.

MATE plans to launch a second alumni survey in December 2019.

85% 85% of the college graduates had earned a STEM degree, and 85% of the then current college students were studying towards a STEM degree.

73% 73% of the employed alumni were working a STEM-related job, and 22% had worked a job related to ROVs or other underwater technologies.

67% Two-thirds (67%) of the alumni credited the ROV competition with influencing their educational/career paths.

37% The ROV competition played a role in alumni attaining employment (37%), admittance into educational programs, college and university (36%), internships (30%), awards (21%), and scholarships (21%).

"As a former competitor, this competition directly impacted my position. Having the real-world experience beyond the classroom was extremely valuable (even outside the marine technology industry)."

- MATE ROV Competition 2019 Volunteer Judge

National Student Clearinghouse (NSC)* Data Matching

A total of 3,974 former competition participants (aka "alumni") were identified for matching with NSC data in the May of 2017. Two-thirds of the alumni (66%, or 2,633) were found in the NSC database. Of the 1,779 with a major of study in the database; 66% were enrolled in a STEM major. Over three-quarters (76%) of the 828 degrees were awarded in STEM disciplines.

A second match with the NSC data is planned December 2019.

*The NSC is a nationwide source of higher education information. Visit https://studentclearinghouse.org to learn more.

DATA SOURCES

Evaluation relies on multiple data sources:

- Post-competition surveys of students, parents, teachers, and judges/volunteers
- Post-secondary data match with the National Student Clearinghouse
- Student alumni survey
- Competition scoring

The evaluation tracks:

- Students' interest and knowledge of STEM careers
- Interest in STEM topics; STEM skills/knowledge
- 21st Century Skills
- Educational and career paths

Analysis also explores the effect of multi-year participation and disparate impacts by demographic group.