Great Lakes Research Center
Michigan Technological University

Annual Summary

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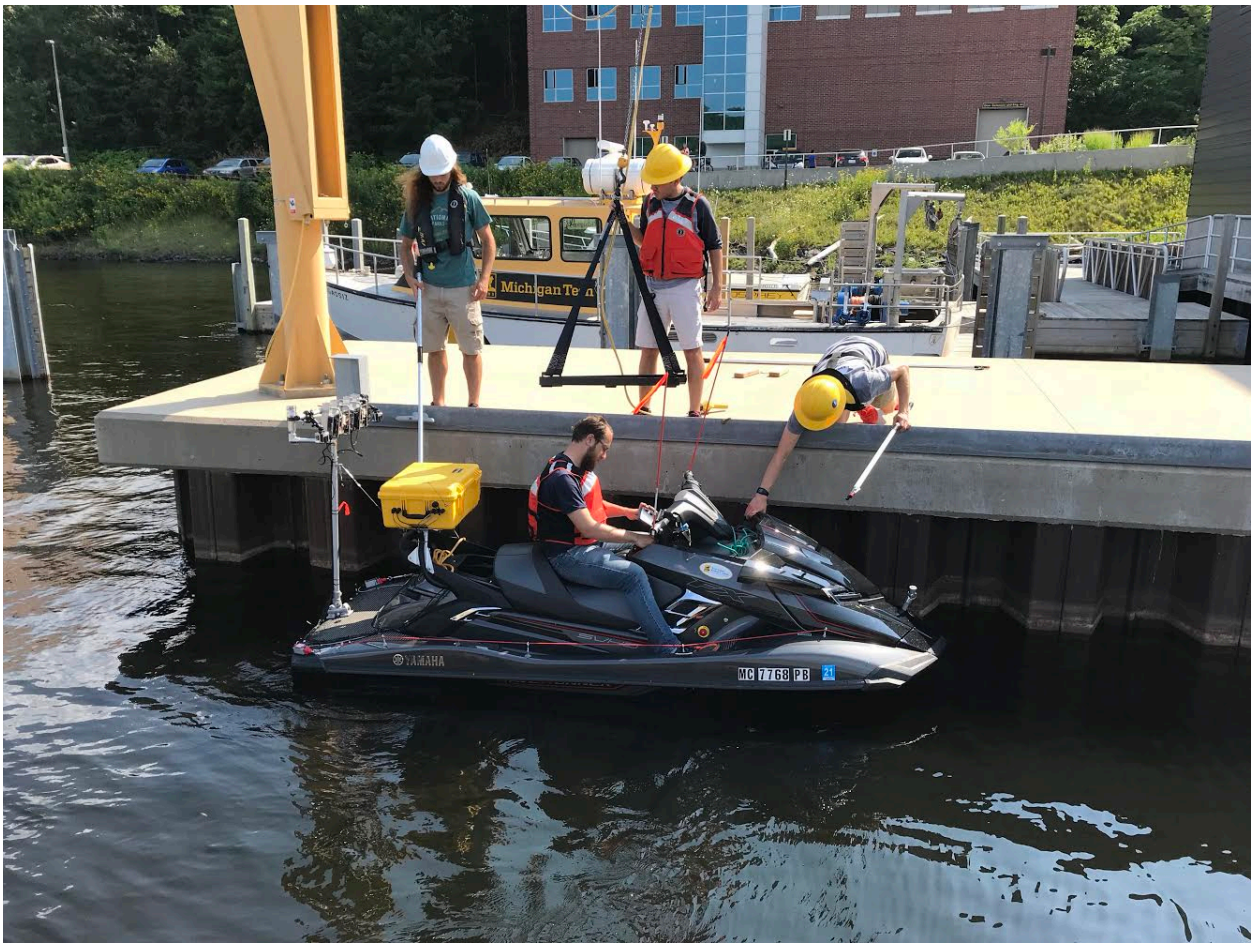

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Overview:
Happy New Year from the Great Lakes Research Center (GLRC) to the Robbins family. We hope all is well with you. All is going very well for the GLRC. This year's summary of my expenditures of the Robbins gift will bring many of the initiatives we began last year to completion and will outline some new and exciting thrusts. Let me start by thanking you again for your continued and steady support of my efforts and those of the GLRC. Together we have dome some very remarkable things!

Again, this year the gift of the Robbins Professor of Sustainable Marine Engineering has continued to provide a wealth of opportunities to the GLRC, our staff and our students that would not be possible without your loyalty and generosity to Michigan Tech. As in previous years, we have not used any of the Robbins funds to support routine efforts or expenses; we have instead elected to invest in strategic, permanent benefits to the Center and the University through our research.

Strategic Investments:

The GLRC continues to grow in reputation, as a world class research center, and in delivering solutions to real-world problems. This is a time of great change in both the federal government and its priorities and here at the university itself. The ability of the GLRC to be nimble and diverse has resulted in our ability to not only respond to changing priorities but, in some cases, to affect and develop policy and funding priorities. As I indicated last year, the clout of the Robbins Professorship and the flexibility that its funding has provided, has played an enormous role in these efforts. You may recall that in 2017 we invested from the Robbins funds in efforts in the Straits of Mackinac to better understand the complex flows existing between Lakes Michigan and Huron. As a result, I was appointed by Michigan's Governor Snyder to his distinguished Pipeline Safety Advisory Board, followed by a unanimous recommendation of the board that Michigan Tech lead and organize other Michigan universities to conduct a comprehensive and Independent Risk Analysis of the environmental and economic impacts of a "worst case" spill of oil from the Enbridge Energy dual pipelines crossing the Straits. That massive analysis has now been completed by a Michigan Tech lead team of 41 researchers (21 of which were from Michigan Tech) representing nine universities. We completed the effort within the required six-month timeline, under budget ($760,000.) and produced a report over 600 pages in total, of very high-quality science. Our final estimates of costs for the worst-case oil spill was just under $2 Billion dollars. What was truly remarkable, is that our science was not challenged by the State of Michigan, Enbridge Energy (who did not like our $2 Billion figure, but did not challenge it) or the general public. That speaks volumes for the reputation of Michigan Tech and the quality of the science/engineering we produce.

You may also recall that Senator Peters requested that I testify before the US Senate's Committee on Commerce, Science and Transportation Subcommittee on Oceans, Atmosphere, Fisheries and Coast Guard. As a result, the concept of a Center of Expertise in Oil and Freshwater has now been signed into the recent US Coast Guard re-authorization bill. We are now working with the Senator's office

to define the scope of this center and the role that Michigan Tech will play. I wish to stress the Robbins professorship has made all of this possible.

In a further strategic investment, we continue our search for funding to acquire an Autonomous Surface Vessel (ASV) for Great Lakes and coastal ocean research. As I mentioned before, we have selected the ASV Global, Co-Worker 5 as the best choice for the GLRC and our research. Unfortunately, our second funding proposal to the National Science Foundation was also unsuccessful. However, in the interim we have secured a grant from the Department of Defense to improve the ways in which autonomous surface vessels negotiate large ocean waves. We are using our big, Lake Superior storms, as a model for ocean storms and have developed a Jet Ski which serves as a scale model of Navy autonomous vessels. To make this successful we have used Robbins funds to employ a total of seven Michigan Tech, undergraduate students for the entirety of last summer to make this Jet Ski perform in large Lake Superior waves (see the cover photo of students in action). We have learned a great deal with this effort and our DOD sponsor is funding the second phase of this effort. Once again, support from the Robbins family has planted the seeds which have made it possible and for us to become a national leader in the area of marine autonomy.

Sustainability Investments:

As in previous years, we have also invested from the Robbins Professorship, in a number of GLRC and campus-wide efforts to sustain our research, students and technical staff. I mentioned last year our investment in upgrading our high-performance computing cluster, "Superior." This investment not only made possible the Independent Risk Analysis of the State of Michigan, but it also advanced the state of Great Lakes numerical hydrodynamic forecasting. In partnership with our National Oceanic and Atmospheric Administration (NOAA) laboratory in Ann Arbor, we have collectively pushed forward by at least a decade, our ability to accurately forecast the movement of water within the Great Lakes. Since approximately 1/3 of both the US and Canadian populations drink Great Lakes waters, it is critical when disasters strike to inform local municipal water intakes (Chicago, Detroit, Cleveland, Toronto, etc.) when and for how long to close down. Our addition of the behavior of Great Lakes ice in this process has greatly enhanced this predictive capability for all.

Finally, we also invested a portion of last year's Robbins support into a fun but solemn project. 2018 was the 100-year anniversary of the end of WWI and the 100-year anniversary of the largest single loss of life on Lake Superior (78 souls). During WWI, the French government secretly contracted with a Canadian ship building company in Thunder Bay, Ontario on our north side of Lake Superior, to build 12 steel hulled minesweepers for the war effort (see the final figure on page 3). Nine of these 140 foot vessels, were completed and sailed out of the Great Lakes to join the war effort. The last three departed Thunder Bay on November 23, 1918 and were stuck by our famous gales of November. Two of the three vessels were lost with their French crews, Canadian Pilots and are lost in US waters, north of the tip of the Keweenaw, Peninsula. We have devoted some Robbins funds to planning a search this spring of our "best guess" location of these wrecks. The water in this region of Lake Superior is very deep (600 – 900 feet) and it will not be an easy search…but we have done our homework and we believe we have some very promising clues. Of course, we will let you know how we do.

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As always, I wish to personally thank you again for making all of this possible with your very generous support of the Robbins Professor of Sustainable Marine Engineering. It has been another fantastic year of growth for the GLRC, where we have been able to do many things that would not be possible without the Robbins Professorship.

Sincerely and Best Wishes,

Guy A. Meadows

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