

Ohio Board of Regents Meeting Minutes
Ohio Board of Regents, Columbus, Ohio
Main Conference Room, 7th Floor
May 14, 2015

I. Welcome and Call to Order

Chair Vinod K. Gupta called the Ohio Board of Regents (BOR) Meeting to order and welcomed the Regents and staff to the May 14th BOR meeting in Columbus.

II. Roll Call

Chair Gupta asked that the roll call be read by Secretary Virginia M. Lindseth. Secretary Lindseth stated, "the record reflects that notice of this meeting was given in accordance with provisions of the Ohio Board of Regents' Ohio Administrative Code §3333-1-14, which rule itself was adopted in accordance with Section 121.22(F) of the Ohio Revised Code and of the State Administrative Procedure Act." Secretary Lindseth called the roll. Those present were:

Vinod K. Gupta
Thomas M. Humphries
Kurt A. Kaufman

Elizabeth P. Kessler
Virginia M. Lindseth

Secretary Lindseth declared there was a quorum present.

III. Approval of Minutes

Chair Gupta asked if there were any additions or corrections to the draft April 13, 2015, minutes. There being none, Vice Chair Humphries made a motion to approve the April 13, 2015, minutes as drafted and the motion was seconded by Regent Kaufman. All Regents voted in favor of the motion approving the minutes as submitted from April 13, 2015.

IV. Lake Erie Initiative

John Carey, Chancellor, BOR, introduced Dr. Bruce McPheron, VP for Agricultural Administration and Dean, College of Food, Agricultural, and Environmental Sciences at The Ohio State University (OSU), Dr. Chris Winslow, Interim Director, Ohio Sea Grant Program (OSG), OSU and Dr. Tom Bridgeman, Western Lake Erie Limnology Laboratory, University of Toledo (UT) to discuss the BOR Lake Erie R and D Initiative. Chancellor Carey said that he was excited that they were presenting to the board members today. He said that last year the Governor made an announcement about several initiatives regarding Lake Erie and the water situation in Toledo. He said all of the state agencies were asked to decide what they could do to assist in these efforts and one of the things that the BOR did with Dr. McPheron's and Dr. Bridgeman's leadership was bring together several private and public institutions.

Dr. Bruce McPheron and his team presented a PowerPoint presentation which can be found as Attachment #1. He began his presentation by saying that his team has a long history of working on Lake Erie projects. He said working with other institutions has been an unparalleled opportunity to build on past connections that were already established but also underscore the use of all available assets to attack a problem of great societal concern.

Dr. McPheron said there were eight institutions involved in the consortium and they were: Bowling Green State University; Central State University; University of Cincinnati; Defiance College; Heidelberg University; Kent State University; OSU; and UT. He said their partners also included four state agencies which are: the Ohio Environmental Protection Agency (OEPA); the Ohio Department of Natural Resources (ODNR); and Ohio Department of Agriculture (ODA); and the Ohio Department of Health (ODH). This was to ensure that they were aligning with the initiatives that the state agencies may have already had in place and prioritizing the needs for research.

Dr. McPheron recounted the algae situation that occurred in the City of Toledo in August of 2014 by indicating that due to toxin microcystin that is produced by a blue-green algae which has had a history of reaching epidemic proportions in the water column in the western basin of Lake Erie the 'taps went dry' for approximately fifty hours. As a result the Mayor of Toledo closed the water system until they could come to terms with the levels of the toxins and the response that was required to ensure continued safety. Since August, there have been a lot of discussions by various government entities and rulings have been issued on the levels of toxins that would trigger various actions – some of these rulings can be confusing and this can pose a challenge. Dr. McPheron said one of the things that he hopes is that the outcomes of the series of BOR's funding projects is that they will begin to help merge these things together.

Dr. McPheron began to explain the objective of the initiative. He said they needed to look for ways that they could adapt to an immediate need with short term results. He said that they have had collectively scores of faculty working on these issues for decades and they have made huge progress in a complicated circumstance. He said they approached the Ohio higher education community with the issue to let them know they did not want to undermine their classic approach of looking for long-term grant support with published long-term results. He said they indicated to them there was funding available if they were willing to abide by different standards. He said they were specifically looking for the following: near term deliverables; collaborative work (academic departments, institutions etc.); and fast action – delivered within the next two years. With these parameters, they have over sixty researchers at eight institutions participating.

Dr. McPheron began to discuss the project process. He said there was a high degree of collaboration and initially they worked remotely for over two months before they held a full-day meeting at Heidelberg University in November. He said that they asked as the projects were developed that funds be matched 1:1. He said that they were able to secure administrative funding from The National Oceanic and Atmospheric Administration (NOAA) and that combined with committed funding from OSU ensured that all of the BOR funding went to direct costs of these projects. He said they started the process in October and six weeks later in December they delivered a full slate of projects to the Chancellor for consideration.

Dr. McPheron said they had five project areas and they were the following: Lake Erie Harmful Algal Blooms (HABs) and Lake Water Quality (two projects); Producing Safe Drinking Water (four projects); Land Use Practices, Sources of Enrichment (two projects); Human health and toxicity (seven projects); and Economics and policy (three projects). He said there were a total of eighteen projects and sixteen Principal Investigators (PI) from five schools. Dr. McPheron said the total BOR investment of funds was \$1.9M and the total university match was \$2M. He said these funds would be for unrecovered indirect costs.

Regent Kessler asked on the matching funds, how much was in-kind vs. cash. Dr. McPheron replied that as it relates to the Field to Faucet Program of the \$1M that was invested in this program, \$200K was sent directly to Heidelberg University. Dr. Winslow added that there were in-kind matches as well in the form of equipment.

Dr. Bridgeman said that when they met late last year with the Chancellor there was a sense of urgency as the Toledo water crisis was fresh in their minds and the Chancellor asked them what they could do about this problem. He said the ultimate problem with the algal blooms is not with the lake but with the water shed and the way that they use the land. He said those kinds of problems are going to take years of work and solutions as they introduce new agricultural practices. He asked what were Toledo, Sandusky, and Cleveland going to do in 2015. They came to the realization that they needed different time scales to be working on – both this year and the immediate future.

Drs. Bridgeman and Winslow explained the following projects: Focus Area 1 – Lake Erie HABs and Water Quality (total - BOR funds: \$499,597; matching funds: \$281,359) HAB Detection, Mapping, and Warning Network: Maumee Bay Area; and HAB Detection, Mapping, and Warning Network: Sandusky Bay. Focus Area 2 – Producing Safe Drinking Water (total - BOR funds: \$495,892; matching funds: \$553,472) Guidance for powdered activated carbon use to remove cyanotoxins; Investigation of water treatment alternatives in the removal of microcystin-LR; Transport and Fate of cyanotoxins in Drinking Water Distribution Systems; and

Investigation of ELISA and interferences for the detection of cyanotoxins. Focus Area 3 – Land Use Practices, Sources of Enrichment, Water Quality and Engineered Systems (total - BOR funds: \$399,945; matching funds: \$472,574* includes \$200,000 from OSU funds) Farmer/Farm Advisor Water Quality Sampling Network; and Identifying the best strategy to reduce phosphorus loads to Lake Erie from agricultural watersheds.

Regent Kaufman made comments about farmers in his area and their practice of draining and 'tiling' to increase water efficiency. Dr. Winslow said that they have a current program related to this that is funded through the OSG Program. He said that they are looking at aerial photographs to see how much tiling is occurring as compared to 20-30 years ago in that basin. He said data is showing that 40-50% of the dissolved phosphorus is coming through the drain tiles. Dr. McPheron added that this is approximately a 30% yield increase in Northwest Ohio soils for a farmer who tiles his field so there is a strong economic incentive to do this.

Senior Vice Chancellor Cates asked for an explanation of 'tiling'. Dr. McPheron explained tile drainage is an agriculture practice that removes excess water from soil subsurface for optimal crop growth and harvesting. The tiles are huge plastic spools that are 6 – 8 feet tall in length.

Drs. Bridgeman and Winslow continued with outlining the remaining projects: Focus Area 4 – Human Health and Toxicity (total: BOR funds: \$407,710 - BOR funds: \$407,710; matching funds: \$544,642* includes \$45,000 of UT funds) Method Development for Detecting Toxins in Biological Samples; Impact of pre-existing liver disease on microcystin hepatotoxicity; Fish flesh and fresh produce as sources of microcystin exposure to humans; Identifying Bacterial Isolates for Bioremediation of Microcystin contaminated waters; Development of Microcystin Detoxifying Water Biofilters; Prevention of cyanobacterial bloom formation using cyanophages; and Evaluation of Cyanobacteria and their Toxins in a Two-Stage Model of Hepatocarcinogenesis. Focus Area 5 – Economics and Policy (total - BOR funds: \$196,317; matching funds: \$210,777) Maumee Basin Lake Erie HABS Nutrient Management Options Comparative Analysis; Social Network Analysis of Lake Erie HABS Stakeholder Groups; and Maumee Basin Lake Erie HABS Stakeholder Informed Decision- Making Support System.

Chair Gupta asked if they were looking at treating the water in the water sheds before distribution. Dr. Bridgeman replied that the best way to treat the water in the water shed is to retain it before it gets from the farm to the major tributaries. He said the wetlands and the retaining ponds are the simplest and most ecological way to treat the water.

Vice Chair Humphries asked if there was a current water retention system in place. Dr. McPheron replied no; there is no regular water retention system in place. He said if you look at the history of land use across the United States they have seen a lot of marginal lands pressed into productivity as the government programs to buy the ecological service use of that land have become pressured.

Dr. Bridgeman gave an update on project status which involved the funding, progress and activity. He said all projects have access to funds as of May 2015, except one. The UT, Bowling Green State University and Kent State University have fronted funds pending BOR funds. He said that all projects are on track within the two year framework; there are shifts in effective start dates; and Lake work is planned for May shifted to June, still in advance of the HAB season. Relating to the project activity he said the Graduate students and technicians have been hired; Equipment, supplies, and software have been ordered; the permit applications have been submitted, training sessions; and Pilot data collection and scale-up readiness.

Dr. Bridgeman outlined examples of ways that BOR funds are being leveraged and he said the following: NASA Glenn is providing graduate student support and frequent aircraft flights over Lake Erie using Hyper-Spectral Imagery to enhance HAB tracking; NOAA GLERL is providing assistance with Lake HAB sensor logistics and networking; City of Toledo is providing funds for enhancements to Lake HAB sensors and access to their intake; NSF/NOAA and other proposals are pending based on BOR projects; and UT has contributed \$200K towards additional projects (Maumee Watershed modeling; GIS and remote sensing of the Maumee Watershed; Effective wetland design and site selection; Public engagement through Citizen Science; and they purchased a \$350K boat and equipment system for the Lake Erie Center as well).

Dr. Winslow said once these eighteen projects were in place there were still conversations to fine tune the details and most of this was with the Board of Agency Advisors (two members from ODH, ODNR, ODA, OEPA, and an individual from the Lake Erie Commission). These individuals were provided regular feedback on these projects to ensure that the projects were going in the direction that they believed were critically important. He said two projects received input from the OEPA during the project development phase prior to the proposals being accepted and post-award, projects have received input from OEPA and collaborative efforts have been from ODNR/other state agencies

Relating to the OSG Management Process, Dr. Winslow said the OSG Business office will monitor project spending and progress. The OSG Business office is also collecting all the information on the results of each project. He said the PIs are required to report on their projects every six months. He said all of this information is available on the OSG website <http://www.ohioseagrant.osu.edu/>.

Dr. Winslow said the status as of May 1st is the following: Board of Agency Advisors has been established; OSG hosted a kickoff webinar to introduce PIs to OSG process and expectations; Quarterly conference calls have been scheduled with PIs and Board of Agency Advisors have been invited as well; funding has been released to all PI institutions; and Work has commenced and equipment has been ordered for the upcoming field season.

Chancellor Carey said that the budget that is being debated by the legislature and that was submitted by the Governor was a request for continuation of funding for this research. The amount or what the research will look like has not been identified; however it is stated in the budget that this will continue to be a priority.

Secretary Lindseth asked if the farmers were aware of the severity of the problem and she wanted to know where they stood on these issues. Dr. McPheron replied absolutely; the magnitude of the problem is realized. The farmers are small businesses, 90% of Ohio farms are family farms. He said many of these have chosen U.S. tax laws and corporation opportunities to run their business. He said they are trying to find the science that allows them to work with a willing group of individuals who will in fact adopt Best Management Practices because they see them as a personal investment and a long term investment for society. Dr. Winslow added one of OSG's major missions is outreach and he spent a great deal of time with farmers discussing these issues. He said the farmers are very inquisitive and they want to know what they can do. He said an OSU study revealed that when surveying farmers 76% recognized what they do on their landscape impacts Lake Erie and of those surveyed 75% are willing to make changes to address those issues.

Dr. McPheron continued the presentation and began to explain the Field to Faucet Program (F2F). He said that OSU designated \$1M for F2F. He said they delayed decision on what projects to fund until the decision was made on the BOR projects so they did not duplicate efforts. He said they are investing in various colleges and projects (manure recycling; app development; bloom mapping; microcystin detection). He said this initiative is possible because of the BOR continued support of the Ohio Agricultural Research and Development Center and OSU Extension Lines. He added that the role of OSG also weaves across all of the areas.

Dr. McPheron finalized the team's comments by discussing the Fertilizer Applicator Certification Training (FACT). FACT required certification and education of all farmers who apply fertilizer to more than fifty acres. He said that ODA partnered with OSU to conduct this training after this was mandated by Senate Bill 150. Since September 2014 they have conducted 110 sessions and trained over 6,400 farmers. OSU has invested over \$1M in base funding towards FACT. He said this is another example of BOR funding being leveraged.

Regent Kaufman said this is an extremely critical issue and most people do not realize how serious it is. He said he understood that the HAB issue would happen again this year. Dr. McPheron replied almost certainly they would experience an average algal bloom and that is not good.

Regent Kaufman made comments about the farming practice of 'tiling' in the winter and said there are farmers that tile land that has drained perfectly well for decades because it increases yields. He said there need to be a proactive dialogue with the agricultural community related to 'tiling' – maybe a moratorium on the practice. Dr. McPheron replied that farmers are making business decisions about tiling. He said with the fall in crop prices there was less tiling done over this past winter than had been done in previous years. He made comments about phosphorus and soil testing as well. He said there are a lot of technologies that are being adopted.

Senior Vice Chancellor Cates said in terms of the policy aspect that it comes down to the legislature and the statutory language. He also said he was curious on what the thoughts of the Ohio Farm Bureau (OFB) were because they will be a key decision maker on public policy. Dr. McPheron replied that they work closely with the OFB and together they formed a group called Healthy Water Ohio. He said they have been working with the OFB on these issues. The OFB put an additional \$1M towards these issues last fall as well.

Regent Kaufman said he was concerned that some members of the agricultural community are going to be 'late actors' in the equation. He said the OSG team has a great program and the BOR funding is very impressive. Dr. McPheron replied that one of the investments that were ensured was an opportunity for OSU to take science-based information out with a sense of imperativeness. He said farmers have changed their practices substantially.

Chancellor Carey said in his opinion nothing is more important than water. He said this kind of cooperation that they are seeing between institutions, as Dr. McPheron said, is a model for the country.

Chair Gupta thanked them for their presentation and for their work on this very important issue. He said that they are very fortunate to be living in the Great Lakes area which has 18% of the fresh water of the entire world. He said that the collaboration among higher education institutions is good; however he did not hear about the involvement of Wright State University and that they were involved in a similar issue in the past. Dr. McPheron replied that they reached out to Wright State University and Case Western Reserve University but did not get a reply from them. They have not ruled out any additional collaboration with these institutions. Chair Gupta said the BOR can assist them with facilitating communication with institutions on these important topics.

Chair Gupta made additional comments about collaborating with private companies and seeking their involvement with projects and processes. He said 75-94% of the research dollars that are spent will never be monetized and he said he is interested in science leading to a solution. He said he will invite them back at a later time for an update to see where they are on these projects.

V. Unmanned Aerial Systems (UAS) Water Quality Study

Chair Gupta introduced Richard Honneywell, Director of the Ohio/Indiana UAS Center and Test Complex (UASC) to provide an overview of the UAS Water Quality Study. He said the board members heard from him about a year ago and he understands that he has made a great deal of progress with implementing some of initiatives. Mr. Honneywell presented a PowerPoint presentation which can be found as Attachment #2.

Mr. Honneywell said he wanted to provide an update on what they have accomplished since he last appeared before the board and a sense of how important their relationship is with the institutions as part of what they are doing. He said he also wanted to provide information about how they are trying to exercise what they are doing into commercialization. He said one of the examples is remote sensing for water and agricultural issues.

Mr. Honneywell said the mission of the UASC is to: Support State Agencies in Technology and Operational Evaluation; Support Universities, State Agencies and Federal Partners in Research; and Coordinate UAS Industry with Business Opportunities in State of Ohio. He said they also work very closely with industry - approximately eighty Ohio companies.

Mr. Honeywell said the planned capabilities related to some the following: Resource for Certificates of Authority (COAs) and Sec 333s (a commercial application) across the region; Airworthiness Assessment; Air Operations/Command and Control Support; Integrated Safety Management System; FAA Reporting; Modeling and simulation; and Remote Sensing Data Management; High bandwidth connectivity across ranges.

As it related to policy, Mr. Honeywell said a lot of what they are allowed to do is based on federal policy. He said that Civil or Public entities may apply for Section 333 Exemptions. They are still required to request a COA. This will give them the authority to fly for two years. He said this is the starting point for commercial activity. They are seeing companies begin commercial activity in precision agriculture and resource survey. As of May 6, 2015, they have granted 248 exemptions. He said that Public entities may also apply for COAs and they have to be under the following circumstances: they must comply with Public purpose; they must not be for profit; and the UAS is leased to and operated under authority of public entity.

Mr. Honeywell outlined the typical Section 333 authorization. He said with this, they have a long way to go but it is moving them into the area of commercialization. He said the State Leadership has approached UAS holistically. He said Ohio's strategy involves supporting Industry through State and Federal Agencies operations, R&D and grants that they are pursuing. Likewise he said, with the Universities and Colleges, they can leverage R&D, Training, and Commercial Collaboration to bring these capabilities forward to support Industry. He also said that research is very critical to this as well. He said that Economic Development Agencies, like JobsOhio, and other regional entities are supporting this activity in terms of Business Attraction, Commercialization, and bringing in Investment Capital. He said they are trying to capitalize across the entire spectrum.

Mr. Honeywell said that they are working in the areas of Precision Agriculture. He said there are a number of capabilities and they are desired or needed in some of the following areas: Crop Scouting; Blight detection; Track invasive insect species, etc. He said there are a number of technology needs as well and some of those are the following: Small Fixed wing and hover vehicles; Visual, Thermal and Multi-spectral sensors; Three dimensional sensing; Data Analytics; and Knowledge Delivery.

Mr. Honeywell said that OSU is doing a number of agricultural research topics using remote sensing. He shared images from different types of cameras. The research topics that are being addressed are some of the following: Directed Scouting; Stand Counts; Flooding; Weed Escapes; Nutrient Deficiencies; Crop Vigor; Total Biomass; Blight; Uniformity of Tassel Emergence; Drainage Quality; Compaction; and Rapid Phenotyping. This research is specifically through remote sensing in collaboration with OSU. With this, Mr. Honeywell said this has been integrated rather effectively with commercial industry. He shared information about a research project that was conducted relating to the soil compaction and yield production on corn and soybean. He said their hope is that farmers will be able to use this research in their decision making.

Mr. Honeywell further explained that the UASC has established six FAA approved COAs for four aircraft types. He said they will be flying over Molly Caren and other research sites for data gathering. This will be the first time that they will have the ability to use remote sensing. He said they have brought in NASA, the Air Force Research Laboratory (AFRL) and the Air Force Institute of Technology in collaboration on the data analytics. In support of Clark State Community College (CSCC) who has initiated the Associate Degree in Precision Agriculture, UASC established one COA that allows CSCC to fly over agricultural fields at Springfield Airport. This gives students the Precision Agriculture knowledge and the UAS skills to support remote sensing.

Mr. Honeywell said there are a number of activities that they can effectively apply UAS to support agency needs around the state. Relating to early capabilities he outlined the following: Assessing water quality and effluence; Inspecting infrastructure; Monitoring tree harvest/poaching; Surveying construction projects; Monitoring drilling sites compliance; Excavation monitoring; Project monitoring and assessment; Tracking invasive species; Inspecting amusement park rides; and Property Surveying and monitoring. He also outlined a number of technology needs such as the following: Sense and Avoid capabilities; Data Analytics; and Knowledge Delivery. He said these are key to commercialization.

Mr. Honneywell said they have been working collaboratively with Dr. McPherson's team and outlined the 2015 HABS Task Force. He said they wanted to bring remote sensing capabilities in the form of unmanned air vehicles and manned air vehicles into use within the state that will understand what is occurring in the water shed as it related to affecting the water quality. He outlined the prioritized objectives for 2015 in the areas of capabilities and the rationale for those. He said the capabilities were the following: campaign operations coordination; enterprise environmental data collection/ processing; and added remote sensing.

Mr. Honneywell explained the objective, operational characteristics, resources required and deployment of HABS Campaign Operations; Enterprise Data; Manned Aircraft; and Unmanned Aircraft as outlined in the presentation. He said that the OARnet/Ohio Supercomputer Center had an appropriation in 2014 to support the infrastructure of Enterprise Data. He said they have asked them to prioritize this to bring forth the infrastructure needed.

Relating to Advancing Resource Survey, Mr. Honneywell said UASC has established two FAA approved COAs to conduct environmental monitoring in Cleveland Metro Parks. He said they will also start work across other metro parks across the state to allow an understanding in the environmental area. He said that OSU is supporting the 2015 data collection for the Cleveland Metro Parks. He said UASC has established two FAA approved COAs to support survey capabilities for the Ohio Department of Transportation. He said they are working with them to assess technology gaps in commercial vehicle and sensor capabilities for bridge infrastructure. He said UAS has aligned a commercial company to assess capability for monitoring drilling site compliance for ODNR. They want to bring hyperspectral capability to expand research on tracking of invasive species.

Mr. Honneywell began to talk about the UAS as it relates to first responders. He said there are a lot of different capabilities of interest in the community. He said a great deal of this interest is with the fire and police departments. He said being able to leverage the FAA into allowing flight operations into urban areas is not an ideal place to be working right now – but it is important to them from a public safety standpoint that they are able to leverage this. As it relates to advancing the first responder capabilities Mr. Honneywell outlined the pending COAs and discussed who was active in this space.

Mr. Honneywell noted the key research areas and a series of different technologies that are important as it relates to commercialization. As it relates to Knowledge Delivery, he said that these three areas were important: Big Data Processing; Rich Metadata with Heuristics; and Domain Dashboard, Metrics and Standards. He went on to discuss Platform and said the following were key: Miniaturized sensors and avionics; High energy density (Li Air, Fuel Cell); Composite Materials; Additive manufacturing; and Aero designs that are optimized. He finished this topic by discussing Integration into National Airspace System and said these key components were: Sense and Avoid; ADS-B; Secure Command and Control; Autonomy; and Human Factors.

Mr. Honneywell said another key area of commercialization for UAS is cost of the systems. He said some of the systems are \$100K and the inexpensive agriculture systems are approximately \$30K. He said an order of magnitude in cost reduction is needed as part of the commercialization process. He said they are seeing this movement in the areas of Aerostat, Fixed Wing, and Rotor Copters.

Mr. Honneywell continued and said that the USAC is Advancing Aeronautical Research by: supporting the Sinclair Community College UAS Training and Certification Center; AFRL and UASC are currently working to bring ground-based sense and avoid operations at Wilmington range; through Third Frontier Support with the University of Dayton pursuing Unmanned Autonomous Systems Verification/Validation Testing Center; UASC established a COA for Wright State University for Modeling and Simulation research at Wilmington Air Park; and UASC are currently processing twelve COAs with the FAA for flight testing at Wilmington Air Park and in West Virginia for UT and the University of Cincinnati.

Mr. Honneywell went on to discuss his observations. He said that they can promote expanded UAS/remote sensing research through the Federal Agencies. He said if you look at the talent and scope of researchers and aerospace capabilities in relationship to the companies to pursue grants they really need to focus on a broad

number of agencies. He went on to say that the Cross University collaboration is both amazing and gratifying. He said as they work through this there should be some interest in Cross disciplinary (department) collaboration. His final observation was UAS provides a premier platform for increased STEM activities. He said that children and students get really excited by flying vehicles and learning in this environment. He outlined STEM opportunities that were available such as Air Vehicle design and flight, experiential flight opportunities, Science Fairs, and Workforce Development.

Mr. Honneywell finished by summarizing and he said that the UASC is committed to assisting the State of Ohio in developing UAS potential. He said they want to enable a more efficient state government and support universities to expand their research potential. He said they are working together to bring needed collaboration across a broad range of Federal, State University and Industry partners. He said the UAS potential is bounded only by imagination and creativity.

Secretary Lindseth asked for Mr. Honneywell's thoughts and the status of the State of Ohio's laws as it relates to a *Wall Street Journal* article from May 13, 2015, 'Drones Boom Raises New Question: Who Owns Your Airspace?' Mr. Honneywell replied that there have been several initiatives put forth by the Ohio House of Representatives; however there has been no movement on those legislative initiatives. He said they have encouraged, through the University of Dayton, to bring forth some privacy policy recommendations. This is so as they are working with the state agencies they are helping to provide guidelines around privacy; giving examples of how the data is stored and used; and ensuring that the public privacy is protected.

VI. Removal of Microcystin Toxins from Drinking Water

Chair Gupta introduced J. Gary McDaniel, CEO, ABS Materials, Inc. (ABS) to discuss the topic of Removal of Microcystin Toxins from Drinking Water. Chair Gupta said that this start-up company was founded at The College of Wooster as a result of Third Frontier funding. Mr. McDaniel presented a PowerPoint presentation which can be found as Attachment #3. He began his presentation by thanking Chancellor Carey and the board members for inviting him before the board to present information about ABS solutions for the mitigation and treatment of HAB specifically relating to the Microcystin Toxins. He said that Microcystin Toxins shut down the Toledo, OH water supply last year.

Mr. McDaniel provided an overview of ABS. He said they are a local company located in Wooster, OH with seventeen employees. He said that ABS was founded to manufacture materials and further innovate based on swellable organosilica (this absorbs contaminants) formulations that were discovered in 2005 at The College of Wooster. He said their major markets have been the following: Drinking Water; Oil and Gas; Groundwater Remediation; Personal Care Ingredients; and Surface Water Treatment. Their whole basis has been to remove contaminants and the HAB is a large contaminant.

Mr. McDaniel shared examples of EPA data from around the state of HAB. He said HAB is a big Ohio problem. Not only are HABs a big Ohio problem but they are a global problem. He said that countries such as China, United Kingdom, South Africa, and Australia have also had to deal with this issue as well. He said if you have water, sunlight, and nutrients, algae will grow. He said that the solutions that the State of Ohio is working on in partnership with the institutions, is making the state at the forefront on attacking some of these problems. He said that the solutions that are developed in the state will become global solutions.

Mr. McDaniel continued and explained the algae bloom effects and causes. He said the effects were the following: Detrimental effect on fish stocks; An impact on tourism and water sport; and algae toxins (microcystin) in drinking water. He said there can be many causes two of which are urban storm water runoff and nutrient runoff from agriculture.

Relating to current strategies, Mr. McDaniel said up until now the approach has been to regulate farmers and seek to "out engineer" nature. He said the practice of regulating farmers is very difficult and trying to "out engineer" nature is a very expensive strategy. He said ABS tries to take a more sustainable approach and works with material that agrees with biology and nature to mitigate the HAB so it does not happen.

Mr. McDaniel said ABS has developed the BioMax technology for nitrate and phosphate removal and explained the material components. Mr. McDaniel explained how the BioMax technology would be layered into the retention ponds. He said this protects the plants and promotes plant growth by taking out the contaminants. He shared nutrient reduction data based on treatment performance.

Mr. McDaniel continued and began to discuss the microcystin. He said that the microcystin is the primary toxin that is produced by HAB. He said that ABS has developed MicroSorb that is specifically engineered to treat microcystin contaminants. He shared information about other treatment options available and said ABS's treatment option was much more effective.

Mr. McDaniel concluded by saying that algae toxins are going to be an increasingly common issue in the State of Ohio and throughout the world. He said that they think the best approach is to prevent nutrient runoff from entering water resources and that is the first line of defense. If microcystin contaminants happen to enter the water source, ABS believes in not wasting billions of dollars on fancy systems – they believe in spot treatment. He said microcystin can be treated using MicroSorb Media. He said if this had been able to be used last year in Toledo, Ohio they would have been able to continue to operate and would not have had to shut down.

Regent Kaufman asked if the product has been used on some of the smaller lakes in the State of Ohio. Mr. McDaniel replied not yet; this technology was recently developed in the last 60 days. He said they are putting together a mobile treatment trailer that will be able to process 200 gallons of water a minute.

Chair Gupta asked why ABS was not part of the institution consortium that Dr. McPheron outlined. Mr. McDaniel replied that he has met with OSU and UT representatives and they are going to try to become members of the consortium. He said so far he has not gotten any commitments. Chair Gupta asked Charles See, Assistant Deputy Chancellor, Board Relations, BOR to facilitate communications between ABS and the appropriate officials at OSU. Mr. McDaniel said they are very grateful for the support of the State of Ohio and the federal government in their development efforts.

VII. Choose Ohio First Program Update and Presentation

Chair Gupta introduced Dr. Briana Hervet, Director, Choose Ohio First (COF), BOR and Brian W. Randolph, Ph.D., PE, Executive Associate Dean of Academic Affairs, UT to provide a COF update and presentation. They presented a PowerPoint presentation which can be found as Attachment #4. Dr. Hervet began her portion of the presentation by saying that they are thrilled to be finalizing their eighth year and she showcased pictures of students that were in the COF program. She said they have had some great successes and momentum which they hope to continue.

Dr. Hervet said as a refresher, COF is a model of recruiting and retaining students in STEMM and STEM education. She said it is more than just funding; it is campuses coming together and building programming around the students that increases the likelihood that they will succeed. She said students also benefit from early connections to business and industry.

Dr. Hervet said that the student selection process for COF students was the following: Not solely need-based or merit-based (they want to get the best and brightest; but they also want to reach that untapped talent of those that may not compete normally); Students must meet campus entrance requirements for their particular major (even though they are a COF program applicant they must still meet rigorous entrance requirements); and Students must complete program-specific activities (must openly share progress that they are making throughout their participation).

Chancellor Carey asked about the non-traditional students participating in the COF program and asked her to explain how they were tracked. Dr. Hervet replied that approximately 25% of students that participate in COF are non-traditional (above the age of 25, career-changers, etc.). She said approximately 40% of the COF students are under-represented or first-generation. She said there is a wide variety of participation across

institutions; both public and private institutions across all areas of the State of Ohio are participating in the COF program.

Dr. Hervet said the COF program serves undergraduate and graduate students. She said the Woodrow Wilson Teaching Fellowships – Ohio STEM Teaching Fellows are a group of students who already have a baccalaureate degree in STEM; who returned and completed a graduate degree in education; and are charged with teaching in a high need district post-graduation. The Primary Care Scholarships were introduced two years ago and are designed to increase the number of medical students who chose primary care. These two programs have been charged with fundamentally rethinking the curriculum in these two areas by making it more dynamic and engaging to students.

Relating to assessing the impact, Dr. Hervet said that they look at the following: Enrollment (Recruitment) of the students into the majors; Persistence in continuing years; Graduation/Completion; and Degree programs that the students are participating in (areas of need, or key Workforce areas for the State of Ohio). She mentioned that the campuses do not receive administrative funding to operate the COF program. She said at least 80% of the campuses have identified a COF program coordinator.

Dr. Hervet said they are seeing evidence of success with COF students. She said the following: they stay enrolled; are more likely to graduate; earn more credits; and stay in the State of Ohio to work and continue to learn. She shared success rate statistics from Fiscal Year 2007 through Fiscal Year 2014 and said that many of the programs boast a retention rate of 80% or higher from year to year. She said that they even have programs that have a 100% retention rate from year to year. This far exceeds most campuses averages for retention rates in STEM.

Dr. Hervet said the graduation outcomes for COF students were the following: at community colleges 63% earned a degree within four years (over this same time period 24% of non-COF students earned a degree); 24% of COF students who began at a community college continued on and completed their baccalaureate degree; at four-year institutions 41% earned a degree within four years (with 50% of the remaining COF students still enrolled or working towards a degree. Over this same time period 33% of non-COF students earned a degree). With this, they are seeing significant differences between COF students and non-COF students who are being monitoring and given support – this is especially true at community colleges.

Dr. Hervet shared COF student statistics relating to the following: gender (50% male/50%female); first generation/low income (approximately 41%, 22% are from a racial/ethnic minority, 25% non-traditional); and Grade Point Average (GPA) by Race/Ethnicity. She said the average GPA for a COF student last year was 3.43 and this exceeds the average GPA for STEM students on many of the campuses.

Dr. Hervet finished her portion of the presentation by discussing the benefits of participating. She said that the benefits include some of the following: Workforce Development; Economic Development; Career Exploration and Awareness for Students; Effective use of resources (public and private); and Building a culture/community of Scholars. She said that institutions are able to connect with business and industry to say they are building a pipeline of talent. She said every COF dollar that an institution receives must be matched. Some institutions are staffing the program and also providing other scholarships/resources to the students. She said the COF program is building a culture of success on the campus. This is building a community of scholars so that students know that they are just not part of the COF program at their home campus but a larger community statewide.

Dr. Randolph began his portion of the presentation by saying that UT's COF proposal that was submitted was centered on entrepreneurship. He said the creation of a culture of entrepreneurship coupled with the COF program has been critical in feeding this group of students into this process and some of their successes. He said building a student culture of engineering entrepreneurship to encourage students to think about ways to take their great ideas and turn them into economic impact after they graduate can be broken down into three areas: Programs; Places; and People.

As it relates to Programs, Dr. Randolph said that when a freshman first arrives they are exposed to the ideas of entrepreneurship through an Engineering Technopreneurship Initiative. Through this he said organizations have been formed and they are: Freshmen Engineering Entrepreneurship Development (FEED); Young Entrepreneurs Society (YES); and the Bioengineering Design Club. He said all of these are introduced to students when they begin at UT in their program and they support them as they move through. He said they have a Minor in Entrepreneurship, Family and Small Businesses in their College of Business and Innovation. He said they have an Annual Angel Pitch competition that is specifically for freshmen at the end of their first year. He explained the judging process and said this pitch sets the scene for commercialization. He said LaunchPad Incubation is a Third Frontier organization on their campus that assists STEM companies who have ideas that they would like to commercialize.

Dr. Randolph said that it is important that students be immersed in 'Places' that really foster the sense of imagination and creativity. With that, UT has both the Thomas and Elizabeth Brady Engineering Innovation Center and the Nitschke Technology Commercialization Complex. He said the Nitschke Technology Commercialization Complex houses several things, one of which is LaunchPad Incubation. He shared photos of these buildings with the members.

Dr. Randolph discussed Student Commercialization. He said recent graduates Kyle Lentz and Connor Kress founded a company Hephaestus Limited that specializes in fire-fighting drone technology. They developed technology with a quad motor drone for infrared sensing for 'hot spots' in fires. They participated in the Angel Pitch at the senior level and they placed. This technology has been commercialized.

Chancellor Carey asked if Hephaestus Limited was manufacturing the drones. Dr. Randolph replied yes; on a small scale.

Dr. Randolph said that they term their scholarship the Choose Ohio First For Engineering Entrepreneurship (COFFEE) Scholarship. He said that the scholars are very proud of this and they are the catalysts for a great deal of activity around the campus and their colleagues. He said they have faculty who are involved with their orientation class through their Capstone Senior Design Class. With this, a continuum of entrepreneurship is taking place. He said both the College of Business and Innovation faculty and the UT Maker Society are very helpful to their students in that they focus on innovating. He said that LaunchPad leadership has been very supportive in terms of what they are trying to do with the students.

Dr. Randolph began to specifically discuss COFFEE and said their first proposal was in 2008 and OSU was their major partner. He said that Stark State College of Technology; Lorain County Community College; and Owens Community College were also their two-year institution partners as well and were 'feeding' students to them. He said the primary objective of COFFEE is to increase the number of Ohio engineering and science graduates equipped with the entrepreneurial training and co-op experiences needed to translate their innovative ideas.

Dr. Randolph continued with the COFFEE outcomes and stated the following: They recruit from Engineering, Engineering Technology, Chemistry and Physics majors: They have had five cohorts totaling 110 UT students to date; They have had 38 graduates through May 2015; All students are required to pursue the Entrepreneurship, Family and Small Business Minor; and COFFEE program recipients do three or more co-op semesters. He said these Co-ops have resulted in 240 placements with 55 Ohio employers which is a significant synergy with the Ohio Means Internships and Co-ops Program. He said of the 38 graduates of the College of Engineering: 18% were first generation; 16% were female; 11% were underrepresented minorities; 29 completed minors in Entrepreneurship, Family and Small Business; and 100% did at least three co-ops.

Dr. Randolph finished by profiling three COFFEE graduates of UT: Jordan Keefe, BSChE May of 2014; Michael Koludrovich, BSME May of 2013, MSME May of 2014; and Jason Owens, BSCSE and BSEE, May of 2012. He provided an overview of each of these students. He talked about the degrees they obtained, the projects they worked on, and where they were in their careers, all of this can be found in the presentation. He said that these

three students give them some sense of the good work that the COF program is doing. UT certainly appreciates the BOR's long term support and they would love to continue to produce graduates like these three.

Chancellor Carey commented that the BOR requested in their budget \$750K to fund an additional COF cohort. He said he is hopeful for passage of this request. He further added that Drs. Hervet and Randolph are doing great work. He said when the board visits some of the institution's campuses there may be an opportunity to hear from some of the COF students.

Chair Gupta said that the data that Dr. Hervet provided on the COF program was very impressive. He said that seeing a government program that is working is very encouraging. He also thanked Dr. Randolph for his presentation as well. He said that he is marveled by the Dean of the UT and made comments about his quiet but strong character.

VIII. Condition Report Subcommittee Update

Liza Kessler, Chair, Condition Report Subcommittee provided a subcommittee update. She began her update by saying that the subcommittee was just provided a draft report but it not ready for full board distribution. The subcommittee will review the draft and they will have the next meeting on May 26, 2015, to discuss the draft. The draft is substantially done but it is still a work in progress. The recommendations are not drafted yet but they plan to have those drafted and circulated before they meet on May 26th.

Regent Kessler said the anticipated timeline is as follows: the subcommittee will review the draft report on May 26th; the draft report will be further refined by BOR staff; and the draft report will available for full review and discussion at the next full board meeting on June 11, 2015. They hope to get the full board a final draft before the full board meeting so all the members have an opportunity to review it so they can have a substantive discussion. She said they will take all board members comments and edits into consideration at the June 11th board meeting and they have one of two approaches to finalizing the Condition Report. If the edits are minor, the board can vote to approve the report giving the Chancellor the authority to finalize the report subject to those edits being made. If the members believe the edits are more substantial, and another draft review is necessary a special meeting of the board will be held. Assistant Deputy Chancellor See added that the decision on next steps relating to finalizing the Condition Report can be made on June 11th.

Chair Gupta asked if the entire board would be provided a draft of the Condition Report. Regent Kessler replied that at this time only the Condition Report Subcommittee members have been provided an initial draft for review and comment. The entire board would be provided a final draft of the report before the June 11th board meeting. Assistant Deputy Chancellor See said June 3rd is the target date for getting the draft report to the entire board.

IX. Chancellor's Report

A. General update

Chancellor Carey began his general update by saying that there have been a number of recent presidential leadership changes at the University System of Ohio institutions and he distributed spreadsheets to the members detailing these. He said that Senior Vice Chancellor Cates represented the BOR on Hocking College's new presidential search and Betty Young was recently named as their new president. He also mentioned that the President of the University of Cincinnati, Dr. Santa J. Ono, was featured in the *Diverse Issues in Higher Education* and BOR has him involved in a number of initiatives.

Chancellor Carey introduced Lynn Trinko who had recently joined the BOR staff as the Assistant Deputy Chancellor of Educational Technology. He said that she would be an integral staff member and would be working closely with OARnet and the Ohio Supercomputer Center. Ms. Trinko introduced herself to the members and said she had an extensive background in higher education as she had been at OSU for over twenty years before joining BOR. She said she had experience in workforce development and policy.

Chancellor Carey said there are currently two institutions under fiscal watch: Owens Community College (OCC) and Central State University (CSU). He said under Senate Bill 6, an institution has to have a composite score of 1.75 or below in order to avoid fiscal watch. He said both OCC and CSU scores this year have been approximately a score of 1. He said both of these institutions have to undergo a plan to align their expenditures with their income. He said the notifications were sent out on April 20th; they have ninety days to submit a plan to the BOR (agency); they have met with both of these institutions; and they have three years to come out of fiscal watch. Chancellor Carey said he is confident that both institutions will come out of this status.

Regent Kaufman asked what the particular issues were at both of these institutions. Chancellor Carey replied that OCC is spending more funding than they are receiving. He said during the recession their enrollment doubled; unfortunately the faculty and staff were not reduced when the number of students decreased. OCC has reduced approximately a third of their budget and are very proactively working on a plan. He said in the last budget bridge funding was put in place for OCC and this may have to be looked at again. Relating to CSU, Chancellor Carey said their situation is a bit more complex as CSU is a Historically Black Colleges and University and these types of institutions are struggling across the nation. They did not meet their enrollment projections and they were not able to adjust their expenses to their income. He said they are doing some initiatives on the state level to assist them. He said they may have to look at some legislative appropriation to assist them. Assistant Deputy Chancellor See added that CSU has been reducing their budget and they have asked them to conduct another institution-wide Administrative Review to determine other efficiencies.

Secretary Lindseth asked about CSU enrollment and if this was down. Assistant Deputy Chancellor See replied that CSU's enrollment was down. They have an enrollment plan in place and they recently hired an 'enrollment coordinator' to development new strategies.

Regent Kaufman asked if there was an opportunity for Land Grant assistance for CSU as part of their status. Assistant Deputy Chancellor See replied that this is being reviewed in the context of CSU's overall plan. They are still going through the steps to apply for specific funding; but any funding that goes towards that will be incorporated for that specific purpose and not be able to alleviate some of the other issues around CSU's current financial situation.

Regent Lindseth asked if CSU had increased their fundraising at all. Assistant Deputy Chancellor See replied that CSU currently has a Capital Campaign in progress but they do not have any data with respect to how successful it is.

Vice Chair Humphries wanted to know what the consequences were if OCC and CSU did not come out of fiscal watch. Chancellor Carey replied that at the end of the three year period if an institution does not come out of fiscal watch it goes into conservatorship and the state takes over management of the institution.

Secretary Lindseth asked if there has been any discussion of merging CSU and Wilberforce University (WU). Chancellor Carey replied that he met with the President of WU. He said closure does seem imminent for WU. The President of CSU has also talked with them about joining efforts as well and they are willing to recognize the historic role that WU has.

David Cannon, Vice Chancellor, Finance and Data Management, BOR, said that OCC and CSU have taken this issue very seriously and have already taken some steps. He said in the first year when their score was under 1.75 they have made progress with their Recovery Plan.

Chancellor Carey said that he met with Northwest State Community College (NWCC) and Terra State Community College (TSCC). He said that they are being very proactive relating to their long-term financial stability. They want to have a shared services model and are creating a Council of Governments to do that. He said they want both the BOR's moral and financial support for this initiative. Chancellor Carey said they were able to give them their moral support. He said they would work towards the financial support as there are funds in the budget for innovation. He said they met at the Scott Park Campus at UT and it is a very well maintained

campus. He said that NWCC and TSCC are partnering with UT and they will start offering programs at this facility. They will 'feed' students into UT's main campus. Chancellor Carey further mentioned that the board should have NWCC and TSCC appear before them at a future meeting to discuss their shared services model. Chair Gupta as budgets are being cut across the state this sounds like a good initiative. He is in favor of NWCC and TSCC appearing before the board.

Chancellor Carey said that he and staff members attended the dedication of the Human Trafficking and Social Injustice Institute at the UT. He said he believed that this is the first of its kind in the nation. Jeff Robinson, Director of Communications, BOR said it is a wonderful facility and the director is very passionate.

B. Globalization

Lauren T. McGarity, Director of Special Projects, Legal, Policy and Legislative Services, of the BOR, provided a Globalization update based on the Ohio Global Reach to Engage Academic Talent (G.R.E.A.T.) initiative. She presented a PowerPoint presentation which can be found as Attachment #5. She began her presentation by sharing a video by Governor John Kasich who outlined the importance of international education and the opportunity it provides for students to succeed. In summary, he outlined the Ohio G.R.E.A.T. initiative and said the state is committed to offering a great experience for international students. He asked those to come to the State of Ohio to discover why it is a great place to study; work; play; and live.

Ms. McGarity continued her presentation by outlining Ohio G.R.E.A.T which was the Chancellor's report and recommendations that was a direct result of House Bill 484. The Chancellor was charged with convening a variety of stakeholders around the state to assess current practices at the post-secondary level and submit recommendations regarding post-secondary globalization.

Ms. McGarity said with this initiative they are trying to accomplish things both within the State of Ohio and globally. In order to position the State of Ohio as a post-secondary destination globally they had to create an identity for the state that would be appealing to international students, businesses and families. The State of Ohio has a lot of 'gems' and they had to ensure that the messaging was representative of that – thus Ohio G.R.E.A.T. - Global Reach to Engage Academic Talent. With that, there are three objectives to this initiative and they are the following: Promote Ohio as a postsecondary destination globally; Encourage international students to remain in the state and engage in the workforce (She said currently the State of Ohio is below average for Optional Practical Training (OPT) which is temporary employment directly related to a student's education); and Enhance global economic opportunities for Ohioans.

Regent Kessler asked how the State of Ohio compared to other states in this area. Ms. McGarity replied that the State of Ohio ranks 7th in the country.

Regent Kaufman asked relative to low OPT averages why students do not stay. Ms. McGarity replied that it is because students are not connected to a business and they do not have the opportunity to engage in an OPT opportunity. She said to increase the engagement of students they need to educate students, post-secondary and industry about this opportunity. Vice Chair Humphries commented that he has had the opportunity to participate with students in OPT opportunities and they are excited to do this. He said it is a matter of how creative they are in reaching into the university system and bringing them into industry.

Ms. McGarity continued and said that the team that worked on the Ohio G.R.E.A.T. initiative included the following representatives: BOR; Governor's Office of Workforce Transformation; Development Services Agency (tourism, export and Third Frontier); OhioMeansJobs; JobsOhio; Key Cities; Ohio Chamber of Commerce; and Others. She said if post-secondary education would be considered an export based on the dollars it generates it would be the seventh largest export of the State of Ohio. She said there are elements on the OhioMeansJobs website that are not applicable to the international student; however they are hopeful that this will be a track in the future.

Ms. McGarity said their message is that Ohio delivers world-class higher education that drives business innovation, improves lives and creates prosperity in a global market. She said this is an intention for a benefit to Ohioans; Ohio native students; and international students/communities.

Ms. McGarity updated current activities relating to the Ohio G.R.E.A.T. initiative. She said the www.ohio-great.us website should be 'live' in the next thirty days. This will be a centralized portal that is highlighted and organized by regions of the state. She said the 'beta' site will be unveiled at the annual International Education Conference (NAFSA) in Boston, MA. This is the first time that the State of Ohio will be represented at this conference or anywhere relative to international education/globalization. She explained the activities that will take place at the conference through connections and ambassadors.

Regent Kaufman asked if there was any information on the website that would outline the world-class companies that are headquartered (i.e. P&G) in the State of Ohio. He said these companies are recognized throughout the world and this may be of interest. Ms. McGarity replied that this is important but her concern was that individuals may contact the companies directly. Once the students are here and enrolled in our institutions there are systems in place to make the connections to the businesses.

Ms. McGarity said they are conducting internal activities as well. They have been working with all of the stakeholders and partners doing the following: Exploring practices and "assets" of postsecondary – government – business – community; Innovating collaborations focused on a unified comprehensive message about Ohio; and Planning state roll-out and regional action plans that will be hosted by JobsOhio and in conjunction with their six regions.

Ms. McGarity said relating to the objective of encouraging international students to remain in the state and engage in the workforce there are federal regulations – immigration law – that have limitations on the student. They anticipate working with Congressional representatives on this issue and there are some other states that are interested on working with them on this as well. She said there are reflective practices to consider as well. They need to reflect on what do they do well and what things can be improved upon.

With that, Ms. McGarity said one of the Chancellor's recommendations in his report was that he adopts a BOR resolution relative to this issue. She asked if the board thought that it was of value to adopt a resolution that outlined what they believed was in the best interest for the State of Ohio as it related to this issue. This would stimulate further conversation at the institution level with both the boards of trustees and the presidents.

Secretary Lindseth asked if each of the institutions in the State of Ohio had efforts of their own. Ms. McGarity replied that not each institution has efforts of their own but some more than others. She said the definition of 'effort' is different at each institution as well. She said the universities have been offering opportunities in this space a lot longer than community colleges have. She sees an asset to the community colleges being fully engaged in this initiative. Vice Chair Humphries agreed and made comments about the 9th-12th graders that are attending school from China. He said these students could move right into a Community College or a University.

Chair Gupta said when he attended his first meeting as a board member and brought up the topic of international students he was not embraced well by some members of the board. He said he is very encouraged by this initiative and he thanked the Chancellor and staff for their work. Ms. McGarity reiterated that the third component of this initiative is to enhance the global economic opportunities for Ohioans – this cannot be omitted.

Vice Chair Humphries shared a story about a Chinese student that attended Youngstown State University and that worked with him. He spoke about the network and access that he had for economic development opportunities in China based on the relationship that was forged with this student. He said that he supported the idea of the board passing a resolution in support of this issue.

Chair Gupta asked that Vice Chair Humphries and Regent Kaufman work with Assistant Deputy Chancellor See on the draft resolution in support of this issue for passage at one of the next board meetings.

C. Academic Program Review Manual Update

Dr. Stephanie Davidson, Vice Chancellor for Academic Affairs, BOR provided an update on the Academic Program Review Manual that the members were provided in advance of the meeting. She said that this manual was last updated in April 2015. She said that the Chancellor has the authority to approve all new programs in the State of Ohio and until last week there were separate rules for different types of institutions. Approximately three years ago, the BOR decided that the process needed to be clear that regardless of the institution type that there were standards that needed to be adhered to and to make clear what the processes were for program approval.

Dr. Davidson said the Associate and Bachelor Degree Programs now require a maximum amount of credit hours. They capped Associate Degree programs at 65 credit hours and Bachelor Degree programs were capped at 126 credit hours; except in programs where there is external licensure or accreditation requirements. She said that a student's coursework requirements and outcomes must be met whether they are taught by full-time or part-time faculty. They also clarified the credentials faculty need to teach courses and that has been very accepted.

Chair Gupta asked if the Chancellor approved any changes to curriculum. Dr. Davidson replied that the Chancellor approved new programs and certain kinds of changes (i.e., if the curriculum has changed over 50%).

Secretary Lindseth asked approximately how many new programs a year are typically dealt with and which ones get denied. Dr. Davidson replied that she did not have accurate numbers but the BOR website has a running list of the programs that have been approved. She said the Educator Preparation Programs are the programs that get denied.

X. Roundtable Discussion

Chair Gupta began the roundtable discussion by saying that the next BOR meeting will be Thursday, June 11, 2015, and will be held at Rhodes State College.

Chair Gupta made comments about the remarks that were made at the Kent State University Investiture regarding Chancellor Nancy Zimpher and the State University of New York (SUNY) being the nation's largest comprehensive system of higher education. He wanted clarification about those remarks as it related to the number of students in the State of Ohio. Dr. Davidson said that Ohio does not have a comprehensive state system as each of the institutions is governed by a board of trustees. Senior Vice Chancellor Cates explained that SUNY has one system for all of their public institutions.

Assistant Deputy Chancellor See asked the Chair and members about potential topics for the next board meeting; he said he was aware of two topics, a COF student representative and NWCC and TSCC appearing before the board, but if there were any more to please bring those to his attention. Chair Gupta said he will send the other topics that have come forward and poll the members.

XI. Adjournment

Chair Gupta asked if there were any further items to be brought before the Board. There being none, Chair Gupta declared the meeting adjourned.


Ohio Board of Regents


Date

Attachment #1

Board of Regents Lake Erie R&D Initiative Summary of Projects

The Ohio State University and University of Toledo



THE OHIO STATE UNIVERSITY



THE UNIVERSITY OF
TOLEDO
1872

On behalf of a consortium of Ohio's higher education system, thanks for this great opportunity

BGSU



UNIVERSITY OF
UC
Cincinnati

DEFIANCE COLLEGE



KENT STATE
UNIVERSITY



*Toxic algal terror
engulfs Toledo!*

THE COLUMBUS
DISPATCH
COLUMBUS, OHIO
BRIAN

PHOSPHORUS
RUNOFF
presents

IT

CAME FROM THE LAKE



Our objectives

- Frame research areas with
 - Rapid and transformative potential
 - Adequate breadth and depth for impact
 - Alignment with state priorities
- Provide real solutions related to both planning and water quality
- Leverage existing research assets and efforts; and increase effectiveness of collaborations among university, agency and municipality partners

The process

- Capitalized on the existing Sea Grant process and many existing collaborative relationships among Ohio researchers
- There was a high degree of collaboration
- There was a 1:1 match from the universities, which was not requested
- Working group consisted of 8 universities, over 60 researchers
- Worked remotely for over 2 months before holding a full-day meeting at Heidelberg University in November with key state officials
- Recommended project areas to Chancellor in December; projects officially launched March, 2015

Partners

Universities

- The Ohio State University
- University of Cincinnati
- Bowling Green State University
- Central State University
- University of Toledo
- Kent State University
- Defiance College
- Heidelberg University

State agencies

- OEPA
- ODNR
- ODA
- ODH

The final suite of projects

Five project areas

Lake Erie HABs and Lake Water Quality (2 projects)

Producing Safe Drinking Water (4 projects)

Land Use Practices, Sources of Enrichment (2 projects)

Human health and toxicity (7 projects)

Economics and policy (3 projects)

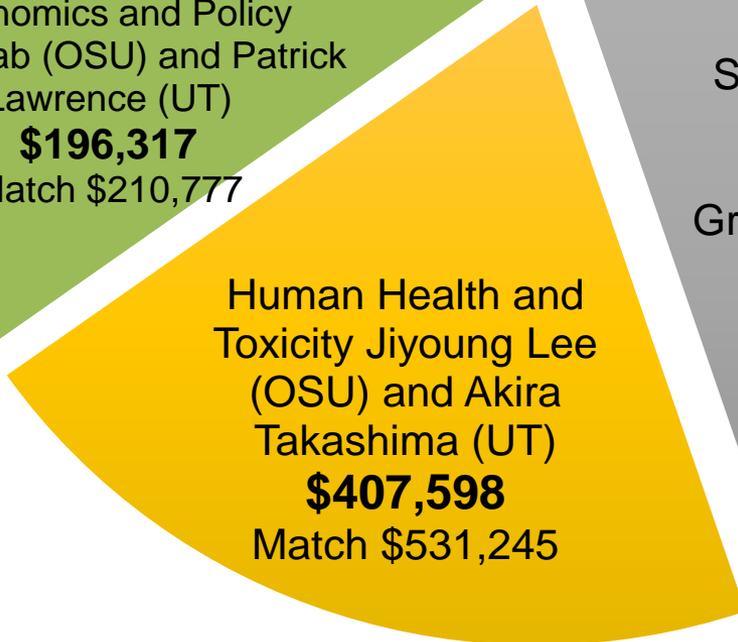
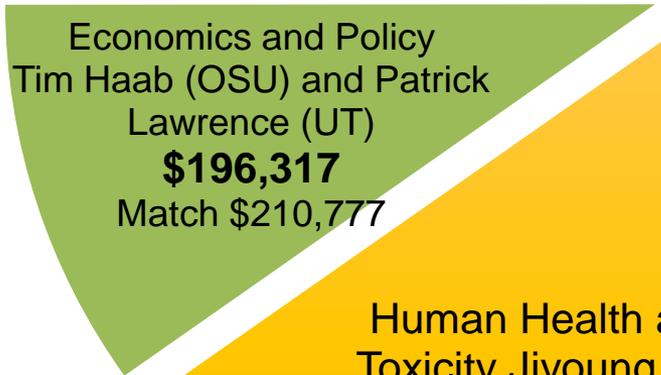
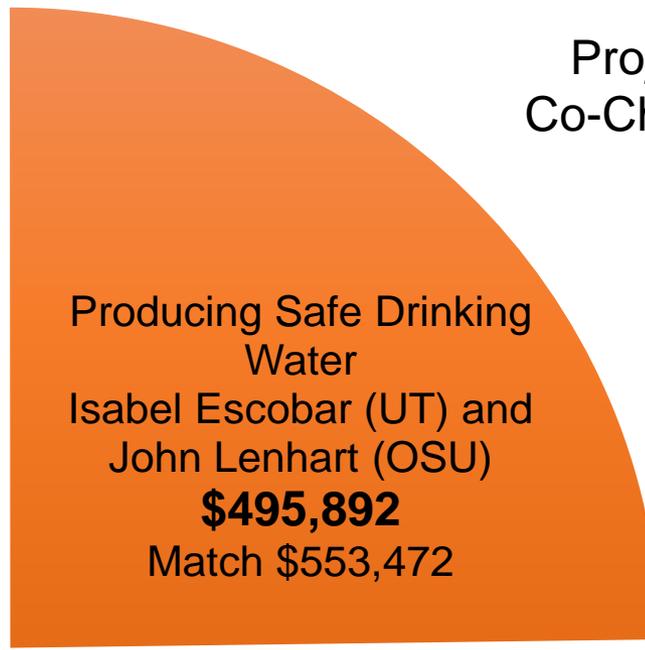
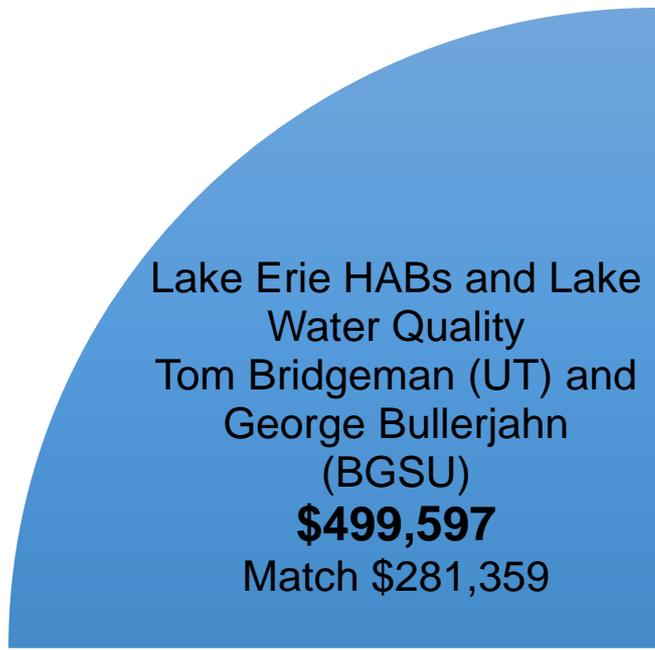
18 projects

16 Principal Investigators from 5 schools

Total BOR funding: \$1,999,348

Total university match: \$2,049,427

Project Focus Area
Co-Chairs and Funding



Total BOR funding: \$1,999,348
Total university match: \$2,049,427
Overall: \$4,048,775

Thanks

- Chancellor Carey and Chief of Staff Matt Whatley
- Co-chair Tom Bridgeman and UT for leadership partnership
- Jeff Reutter, Director Emeritus of Ohio Sea Grant
- In particular, special thanks to OEPA for their high level of engagement from start to finish

Projects and Process

Thomas Bridgeman, University of Toledo

Chris Winslow, Ohio Sea Grant

Focus Area 1 – Lake Erie HABs and Water Quality (\$500,000)

1. HAB Detection, Mapping, and Warning Network: Maumee Bay Area
 - PI: Thomas Bridgeman, University of Toledo
 - BOR Funds: \$249,597, Matching Funds: \$118,950
2. HAB Detection, Mapping, and Warning Network: Sandusky Bay
 - PI: George Bullerjahn, Bowling Green State University
 - BOR Funds: \$250,000, Matching Funds: \$162,409

TOTAL - BOR Funds: \$499,597 Matching Funds: \$281,359

Focus Area 2 – Producing Safe Drinking Water (\$500,00)

1. Guidance for powdered activated carbon use to remove cyanotoxins
 - PI: John Lenhart, Ohio State University
 - BOR Funds: \$114,674; Matching Funds: \$128,526

2. Investigation of water treatment alternatives in the removal of microcystin-LR
 - PI: Isabel Escobar, University of Toledo
 - BOR Funds: \$199,998; Matching Funds: \$191,306

3. Transport and Fate of Cyanotoxins in Drinking Water Distribution Systems
 - PI: Isabel Escobar, University of Toledo
 - BOR Funds: \$106,209; Matching Funds: \$126,231

1. Investigation of ELISA and interferences for the detection of cyanotoxins
 - PI: Isabel Escobar, University of Toledo
 - BOR Funds: \$75,011; Matching Funds: \$107,409

Total: BOR Funds: \$495,892; Matching Funds: \$553,472

Focus Area 3 – Land Use Practices, Sources of Enrichment, Water Quality and Engineered Systems (\$400,000)

1. Farmer/Farm Advisor Water Quality Sampling Network
 - PI: Greg LaBarge, Ohio State University
 - BOR Funds: \$148,380; Matching Funds: \$38,578
2. Identifying the best strategy to reduce phosphorus loads to Lake Erie from agricultural watersheds
 - PI: Laura Johnson, Heidelberg University
 - BOR Funds: \$251,565; Matching Funds: \$433,996* includes \$200,000 from OSU Field to Faucet

**Total: BOR Funds: \$399,945; Matching Funds: \$472,574*
includes \$200,000 from OSU Funds**

Focus Area 4 – Human Health and Toxicity (\$400,000)

1. Method Development for Detecting Toxins in Biological Samples
 - PI: Kenneth Hensley, University of Toledo
 - BOR Funds: \$45,000; Matching Funds: \$80,621
2. Impact of pre-existing liver disease on microcystin hepatotoxicity
 - PI: Thomas Sodeman, University of Toledo
 - BOR Funds: \$45,000; Matching Funds: \$223,588
3. Fish flesh and fresh produce as sources of microcystin exposure to humans
 - PI: Stuart Ludsin, Ohio State University
 - BOR Funds: \$162,598; Matching Funds: \$95,109
4. Identifying Bacterial Isolates for Bioremediation of Microcystin-contaminated Waters
 - PI: Xiaozhen Mou, Kent State University
 - BOR Funds: \$40,112; Matching Funds: \$20,056

Total: BOR Funds: \$407,710; Matching Funds: \$544,642* Includes \$45,000 of UT Funds

Focus Area 4 – Human Health and Toxicity (\$400,000) Continued.....

5. Development of Microcystin Detoxifying Water Biofilters
 - PI: Jason Huntley, University of Toledo
 - BOR Funds: \$45,000; Matching Funds: \$88,740
6. Prevention of cyanobacterial bloom formation using cyanophages
 - PI: Jiyoung Lee, Ohio State University
 - BOR Funds: \$40,000; Matching Funds: \$20,328
7. Evaluation of Cyanobacteria and their Toxins in a Two-Staged Model of Hepatocarcinogenesis
 - PI: Christopher Weghorst, Ohio State University
 - BOR Funds: \$30,000; Matching Funds: \$16,200

Total: BOR Funds: \$407,710; Matching Funds: \$544,642* Includes \$45,000 of UT Funds

Focus Area 5 – Economics and Policy (\$200,000)

1. Maumee Basin Lake Erie HABS Nutrient Management Options Comparative Analysis
 - PI: Timothy Haab, Ohio State University
 - BOR Funds: \$64,650; Matching Funds: \$42,482

2. Social Network Analysis of Lake Erie HABS Stakeholder Groups
 - PI: V. Kelly Turner, Kent State University
 - BOR Funds: \$65,166; Matching Funds: \$33,904

3. Maumee Basin Lake Erie HABS Stakeholder Informed Decision-Making Support System
 - PI: Patrick Lawrence, University of Toledo
 - BOR Funds: \$66,501; Matching Funds: \$134,391

Total: BOR Funds: \$196,317; Matching Funds: \$210,777

PROJECT STATUS

1. Funding

- All projects (except 1) have access to funds as of May 2015
- U. Toledo, BGSU, and KSU have fronted funds, pending OBOR funds

2. Project Progress

- All projects are on track within 2 year framework.
- Shifts in effective start dates
- Lake work planned for May shifted to June, still in advance of HAB season.

3. Project Activity

- Graduate students and technicians hired
- Equipment, supplies, and software ordered
- Permit applications submitted, training sessions
- Pilot data collection and scale-up readiness

BOR Funds provide leverage and enhance collaborations

- NASA GLENN is providing graduate student support and frequent aircraft flights over Lake Erie using Hyper-Spectral Imagery to enhance HAB tracking.
- NOAA GLERL is providing assistance with lake HAB sensor logistics and networking.
- City of Toledo is providing funds for enhancements to lake HAB sensors and access to their intake.
- NSF, NOAA and other proposals pending based on BOR projects.
- U. Toledo has contributed \$200,000 towards additional projects:
 - Maumee Watershed modeling
 - GIS and remote sensing of the Maumee Watershed
 - Effective wetland design and site selection
 - Public engagement through Citizen Science

Benefits of the University/ State Interaction

2 projects received input from the Ohio EPA during the project development phase prior to the proposals being accepted.

1. Investigation of water treatment alternatives in the removal of microcystin-LR (Escobar, UT)
 - OEPA suggested Potassium Permanganate be added as a water treatment alternative
2. Fish flesh and fresh produce as sources of microcystin exposure to humans (Ludsin, OSU)
 - OEPA suggested expanding this project to evaluate if fish consumption advisories are needed during harmful algal blooms

Benefits of the University/ State Interaction

Post-award, projects have received input (Ohio EPA) and collaborative efforts (Ohio DNR) from state agencies.

1. Investigation of ELISA and interferences for the detection of cyanotoxins (Escobar, UT)
 - OEPA suggested further communications to discuss methodology and avoid potential overlap with current OEPA projects
2. Fish flesh and fresh produce as sources of microcystin exposure to humans (Ludsin, OSU)
 - Ludsin and colleagues are collaborating with the Ohio Department of Natural Resources - Division of Wildlife on the fish collection process to streamline sampling efforts

Ohio Sea Grant Management Process

- All projects are now available to view on our website (www.ohioseagrant.osu.edu)
 - Links are on our homepage as well as the research page
 - Viewers can read the objectives, rationale, and methodology of each project
- Principal investigators will be required to report on their projects every 6 months (reports due April 30th, and October 31st of each year)
 - Updates on results, personnel, students mentored, publications, presentations, etc.
- OSG Communications department will highlight these projects in our *Twineline* publication, on our websites, and with a webinar series
- OSG Business office will monitor project spending and progress

Status as of May 1, 2015

- A Board of Agency Advisors has been established with representation from OEPA, ODNR, ODH, ODA, and the Lake Erie Commission
- Ohio Sea Grant hosted a kickoff webinar to introduce PI's to the Sea Grant Process, discuss our expectations, and to each other
 - The Agency Advisory Board was active on this webinar
- Quarterly conference calls have been scheduled with project PI's to discuss any issues, progress, achievements, and upcoming timelines
 - The Agency Advisory Board has been invited to join these calls
- The funding has been released to all PI institutions
- Work has commenced and equipment has been ordered for the upcoming field season

Additions to the active Ohio colleges

- Defiance College (Dr. Doug Kane) has joined the project led by Dr. George Bullerjahn at Bowling Green State University, “HAB Detection, Mapping, and Warning Network: Sandusky Bay”
 - Dr. Kane will assist with sample collection and analysis
- We are making it a priority to add Central State University as a partner institution in this initiative
 - Investigators from CSU were active at the Heidelberg meeting in November

A bit about Ohio State's synergistic activities in this area

Field to Faucet Research
Fertilizer Applicator Training

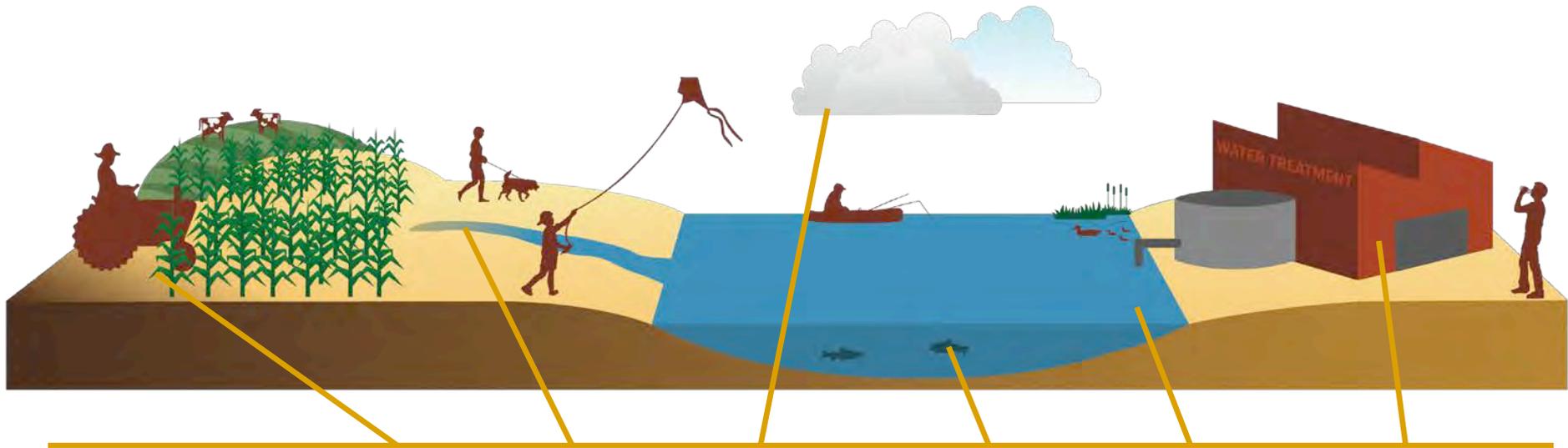


Field to Faucet: An End-to-End Approach

- 5 new funded research projects, 1 co-funded BOR project
- \$1 million from Ohio State; engaging with funding partners
- Projects launched March, 2015
- Systems approach: sustainable food, safe water
- Goal is to accelerate applications
- In planning F2F, were strategic about:
 - Aligning with other agencies & universities
 - Identifying and addressing knowledge gaps



Layering for maximum impact



**Board of Regents
funded projects**

BMP
Guidebook

Integrated
WQ Array

HABs Early
Warning
Network

Human,
fish, food
toxicity

Toxin
detection
technologies

Toxin
treatment
technologies



Ohio State's Field to Faucet Initiative



Manure Recycling



BMP Apps



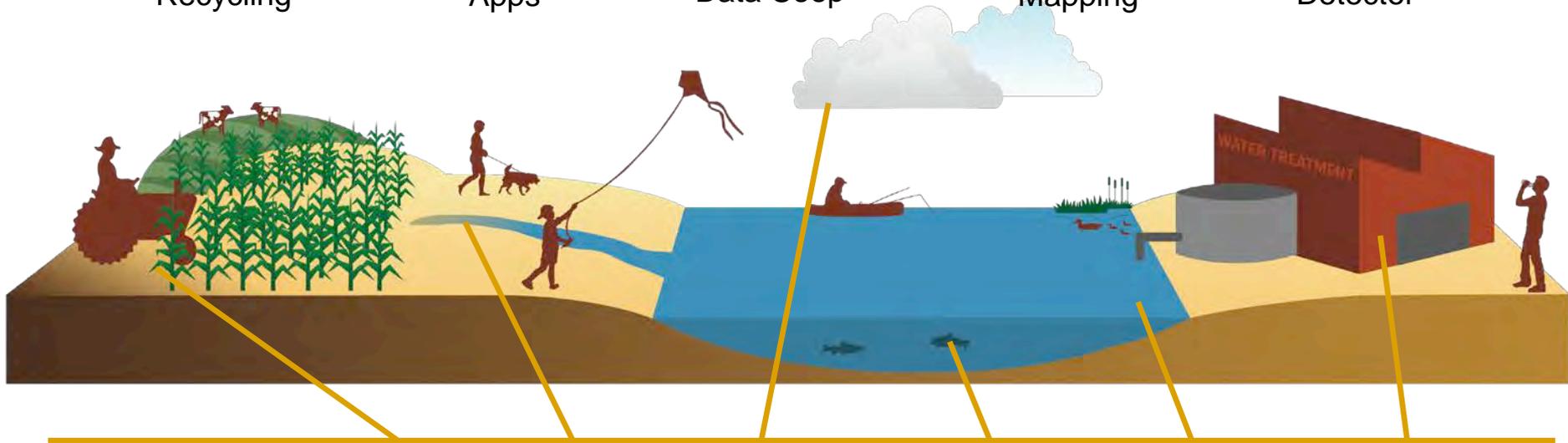
Neutral Data Coop



Bloom Mapping



Microcystin Detector



Board of Regents funded projects

BMP Guidebook

Integrated WQ Array

HABs Early Warning Network

Human, fish, food toxicity

Toxin detection technologies

Toxin treatment technologies



Fertilizer Applicator Certification Training (FACT)

- Ohio Department of Agriculture is the issuing authority
- OSU Extension provides required training
- Since September 2014:
 - 110 sessions
 - **6439 trainees**



Ohio Aerospace Leadership and the Potential Role of UAVs

14 May 2014

Briefing to the Ohio Board of Regents

Richard Honneywell
Executive Director
OH/IN UAS Center and Test Complex
richard.honneywell@dot.state.oh.us
937-497-6720 (O) 937-716-0944 (C)



OH/IN UAS Center & Test Complex

Mission

- Support State Agencies in Technology and Operational Evaluation
- Support Universities, State Agencies and Federal Partners in Research
- Coordinate UAS Industry with Business Opportunities in State of Ohio

Planned Capabilities

- Resource for COAs and Sec 333s across region
- Airworthiness Assessment
- Air Operations/Command & Control Support
- Integrated Safety Management System
- FAA Reporting
- RDT&E Collaboration
- Modeling and simulation
- Remote Sensing Data Management
- High bandwidth connectivity across ranges
- Access to multiple test ranges offering special use and Class D airspace
- Privacy Research and Policy development

Catalysis for commercialization

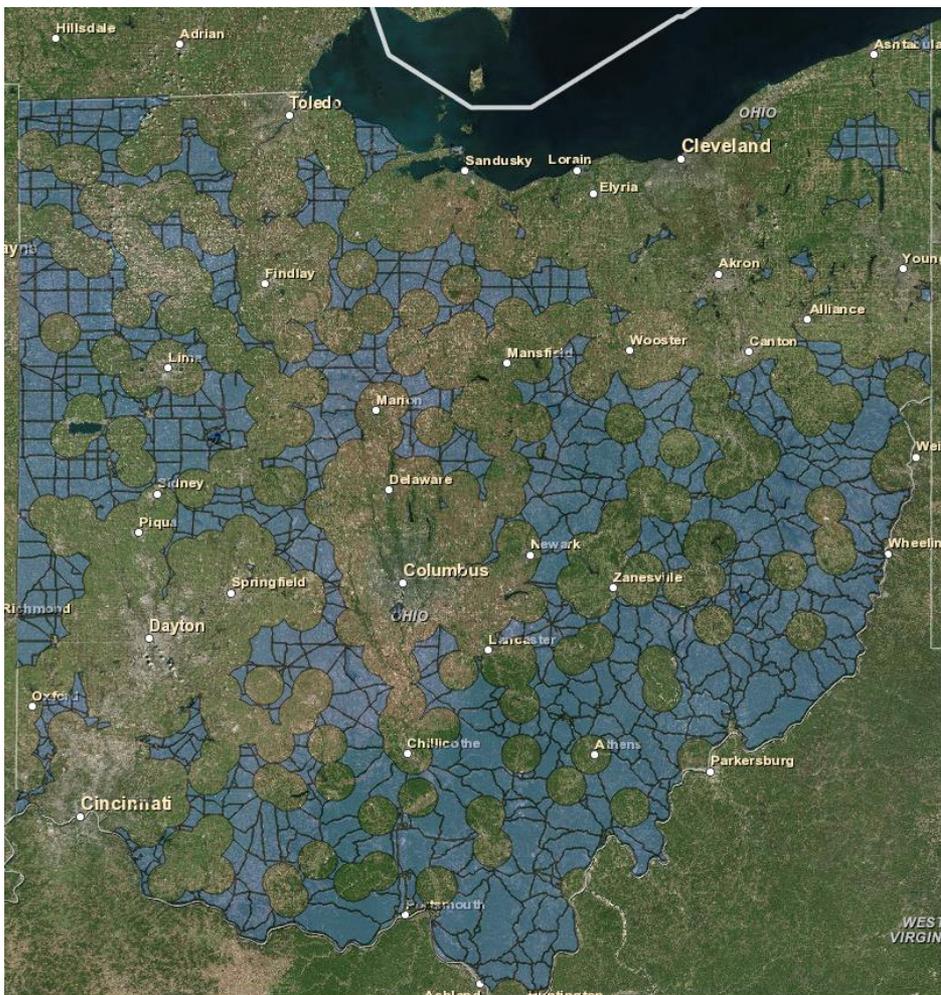


Current Pathways to UAS Flight

- **Civil or Public entities may apply for Section 333 Exemptions – Civil Aircraft**
 - **Certificates of Authorization (COA) required**
 - **COAs are specific to platform and configuration and location(s)**
 - **COAs provide authority for flights for up to 2 years**
 - **Allows commercial activities**
 - **248 Exemptions granted as of 6 May 15**
- **Public entities may apply for COAs – Public Aircraft**
 - **Must comply with Public purpose ... First responder, natural resource management, aeronautical research**
 - **Public entity may not profit, but businesses can provide needed services**
 - **UAS is leased to and operated under authority of public entity**



Typical Section 333 Authorization



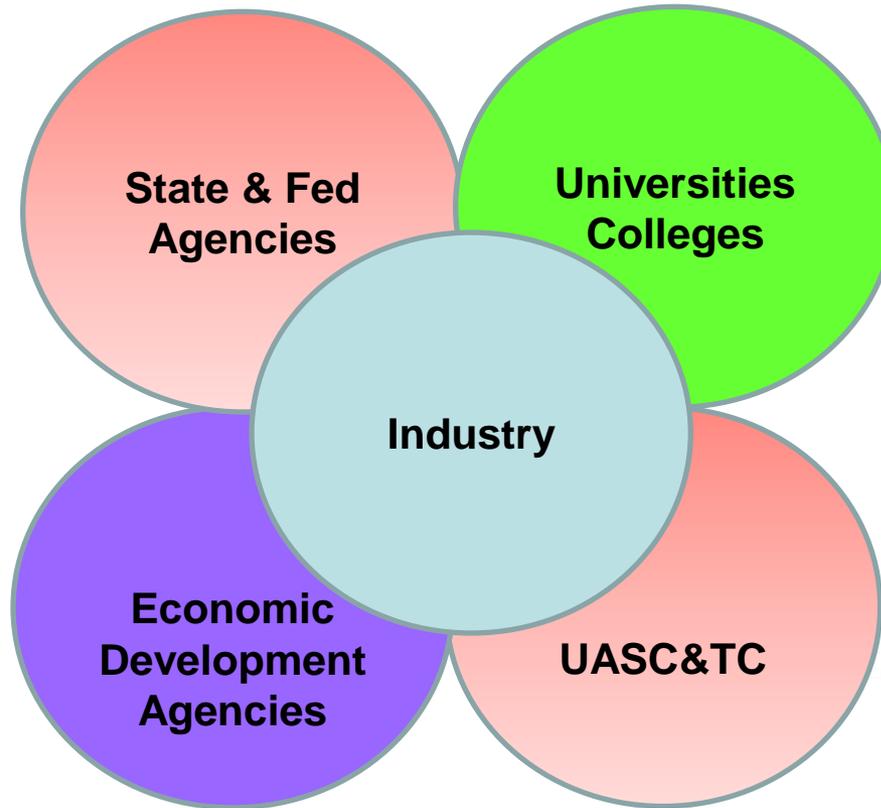
- Specified aircraft under 55 lbs
- Flights must be conducted below 400'
- Flights must follow Visual line of sight (VLOS) rules
- Licensed pilot + current driver's license
- Visual Observer required
- Exemption valid only for areas indicated in blue
- Flights offset from non-participating persons, vessels, vehicles, and structures of 500'
- COA required for operations – blanket COA under 200' allowed for Section 333 exemptions

~ 16,000 of 45,000 square miles useable under Sec 333



Ohio's Strategy

- Operations
- R&D
- Grants



- R&D
- Training
- Commercial Collaboration

- Business Attraction
- Commercialization
- Investment Capital

- Catalyze opportunities
- Support safe operations through planned capabilities

Supporting development of UAS-based Industry capabilities



Precision Agriculture



Capabilities

- Crop Scouting
- Blight detection
- Track invasive insect species
- Precision Insecticide control
- Precision fertilization
- Moisture detection
- Harvest-ready detection
- Yield Estimates
- Insurance Evidence

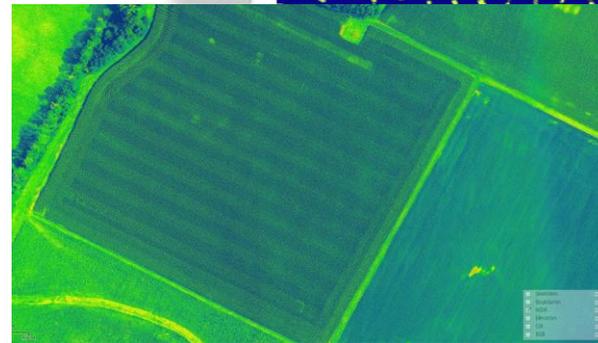
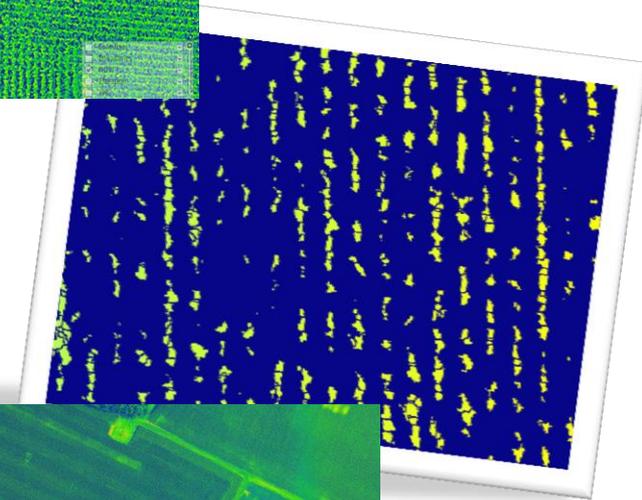
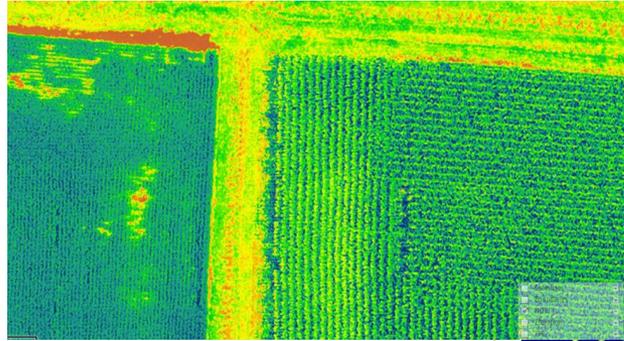
Technology Needs

- Small Fixed wing and hover vehicles
- Visual, Thermal & Multi-spectral sensors
- Three dimensional sensing
- Durability and Endurance
- Data Analytics
- Knowledge Delivery

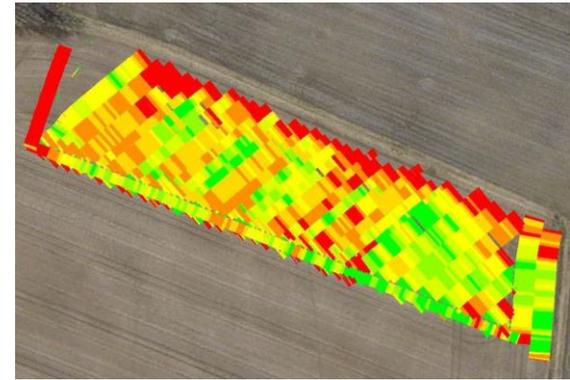
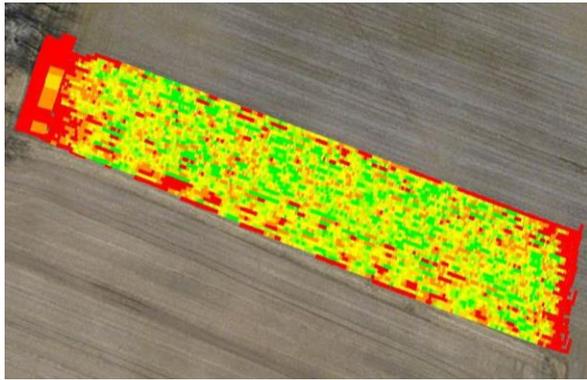


Sample Ag Research Topics

- Directed Scouting
- Stand Counts
- Flooding
- Weed Escapes
- Nutrient Deficiencies
- Crop Vigor
- Total Biomass
- Blight
- Uniformity of Tassel Emergence
- Drainage Quality
- Compaction
- Rapid Phenotyping



Crop Response to Traffic Events



Average Corn Yield (6 Row Pass)

Traffic Event	Yield (bu/ac)	Yield Loss (%)
Wheeled	185.5	10.90
Tracked	202.2	2.88
Control	208.2	-

Average Soybean Yield (Plot)

Traffic Event	Yield (bu/ac)	Yield Loss (%)
Wheeled	28.1	28.32
Tracked	36.3	7.40
Control	39.2	-



Advancing Precision Agriculture

- **OSU**
 - UASC established 6 FAA approved COAs for 4 aircraft types
 - Weekly Flying Operations and Data Gathering planned at Molly Caren and other research sites
 - OSC working to provide data solution for big data storage and warehousing
 - AFRL, AFIT and NASA collaborating on data analytics
- **Clark State**
 - Initiated Associate Degree in Precision Ag
 - UASC established 1 FAA approved COA at Springfield AP
 - Develops crop consultants with Precision Ag knowledge and UAS skills to enter workforce
- **UASC preparing Section 333 to enable Ag Extension educational support to commercial farmers and broader educational support**



Resource Survey



Early Capabilities

- Assess water quality & effluence
- Inspect infrastructure
- Monitor tree harvest/poaching
- Survey construction projects
- Monitor drilling sites compliance
- Excavation monitoring
- Project monitoring & assessment
- Track invasive species
- Inspect amusement park rides
- Property Survey and monitoring

Technology Needs

- Small Fixed wing, and hover vehicles
- Visual, Thermal & Multi-spectral sensors
- Sense and Avoid capabilities
- Data Analytics
- Knowledge Delivery



2015 HABs Task Force

- Ohio EPA
- Ohio Dept Natural Resources
- Ohio Dept Agriculture
- NASA Glenn Research Center
- US EPA
- AF Research Laboratories
- Naval Research Labs (Stennis & DC)
- NOAA Great Lakes Environmental Research Lab
- USGS Lake Erie Biological Station & Ann Arbor Offices
- Old Woman Creek NOAA National Estuarine Research Reserve
- Ohio Aerospace Institute
- Cleveland Water Alliance
- New York Upstate Freshwater Institute
- OHIOVIEW:
 - University of Toledo
 - Kent State University
 - University of Cincinnati
 - Central State University
 - Bowling Green State University
 - Ohio University
- The Ohio State University
- Wright State University
- University of Dayton
- Heidelberg
- MICHIGANVIEW:
 - Michigan Tech Research Institute
- College of Charleston

Diverse and collaborative team



Prioritized Objectives for 2015

Capabilities

- **Campaign operations coordination**
- **Enterprise environmental data collection/ processing**
- **Added Remote sensing**

Rationale

- **Leverage benefits of collaboration between remote sensing and in-water activities**
- **Evaluate AF-sourced tools**
- **Collaborative space for gov't and universities**
- **Shared data processing and analytic tools**
- **Modern 'big data' mining tools**
- **Enterprise data capability**
- **Improved awareness supporting public safety**
- **Increased effectiveness of in-water sampling**
- **Begin efforts to establish organic capability for broader use across Ohio**



HABs Campaign Operations

Objective: Establish capabilities needed to coordinate HABs Campaign Operations across all Federal, State and University team members

Operational Characteristics:

- ✓ Web-based tool to coordinate operations planning in real time
- ✓ All collection plans synchronized with environmental data
- + Plans and data searchable by day/time, organization, and sensor type
- + UASC supporting operations coordination

Resources Required:

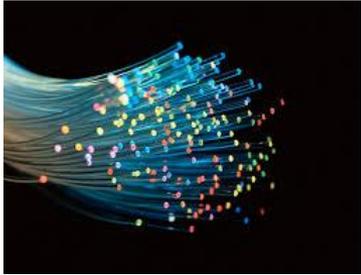
- ✓ WSRI planning tool includes satellite, flight, and in-water operations
- + UASC employees augmented by 2 Intern positions
- + STEM support (~6 positions) requested to augment in-water teams and liaison with NASA, NOAA and balance of HABs Team

Deployment:

- Prototype scheduling tool demonstration – May 2015
- Tools operational (includes mobile app for sample collection) – Jun 2015
- Campaign planning and support through Sep 2015



Enterprise Data



Objective: Establish enterprise data capability for environmental and Agriculture data collection and processing

Operational Characteristics:

- ✓ University-led collaboration on data requirements for water and Ag
- ✓ Leverage existing Ohio infrastructure
- + OARnet connectivity
- + OSC storage and processing infrastructure backbone
- + Implement modern big data mining tools, metadata and security designs
- + Leverage AFRL, NASA and University data analytic tools
- Resource and train data processing workforce as STEM initiative



Resources Required:

- + OSC infrastructure ~ 7 Nodes w/4TB Storage/16 GB Ram/3.7 GHz Processors
- + Hadoop (freeware) + Query tool (freeware + licensing)
- + Leverage OSU's Field to Faucet Initiative to develop meta-data and warehouse design enabling broad multi-Agency and University initiative

Deployment:

- + OSC allocating 10TB initial data storage – hosting/evaluating tools – Apr/May 2015
- + Assessing remote processing capabilities using OARnet/OSC – Apr/May 2015
- 2014 HABs data collection ingested – Jun 2015
- Process 2015 HABs Campaign and Ag data – Jun – Oct 2015
- Historical data base (OhioView) ingested – Sep 2015
- Operational Warehouse (metadata, queries, automated views) ~ +4-6 months



Manned Aircraft

Objective: Monitor Lake Erie and broad areas of watersheds contributing nutrients



Operational Characteristics:

- Augment planned NASA & NOAA flights to allow 3x per week data collection
- Increased frequency for monitoring Maumee and Sandusky Watersheds
- Coordinated with ODOR and OSU in-water activities to identify nutrient sources and algae

Resources Requested: (~10 missions)

- Leverage existing Agency (ODOT or ODNR) or university (OU) aircraft
- Integrate loaned University sensor
- Operations ~\$2300/Mission
- Data induction and processing ~\$5000/Mission

Deployment:

- Proposed as 10 flights over 10 week campaign aligned with NASA and NOAA flight planning



OHIO
UNIVERSITY

Unmanned Aircraft / Aerostat



Objective: Monitor high interest locations on watershed and lake on tasked basis

Operational Characteristics:

- Monitoring at risk water intakes
- Monitoring Maumee and Sandusky Watershed Flow
- On demand or continuous monitoring at locations of interest
- Higher resolution data acquisition



Resources Requested: (~ 10 missions)

- Utilize existing university/college (OSU, Sinclair) UAS or ODOT aerostat
- Integrate loaned university or commercial sensors (UD)
- FAA Certificate of Authorization or Waivers required
- UAV/Aerostat Operations~ Request for support of up to 10 operations
- Data induction and processing



Deployment:

- Tasked as required over 10 week campaign to multiple sites



Advancing Resource Survey

- **Cleveland Metro Parks**
 - UASC established 2 FAA approved COAs (3 pending) for 1 aircraft types
 - OSU supporting 2015 data collection
- **ODOT**
 - UASC established 2 FAA approved COAs for 1 aircraft type assessing survey capabilities
 - Assessing technology gaps in commercial vehicle and sensor capabilities for bridge infrastructure
- **ODNR**
 - Commercial UAS aligned to assess capability for monitoring drilling site compliance
 - Hyperspectral provides capability to expand research on tracking of invasive species, but research needed
- **UASC preparing Section 333 to enable broad State-wide resource survey activities in support of ODOT, ODNR, OEPA and Universities**



First Responder



Early Capabilities

- Track active shooter
- Document Accident
- Monitor traffic flow/alternative routes
- Document Crime Scene
- Deterrent Patrols
- Detect and locate CBRN hazards
- Locate & monitor Illegal drug production
- Restore Communications
- Public address
- Event Situational Awareness

Technology Needs

- Small Fixed wing, and hover vehicles
- Visual, Thermal & Multi-spectral sensors
- Durability & Cost
- Operations Development
- Rapid Data analysis/evidence
- Training



Secure Facility Surveillance



Early Capabilities

- Surveillance of facility boundaries
- Locate and identify contraband
- Document facility intrusion/intruder
- Integrated into Operations Center
- Support pursuit and arrest
- Increased deterrence
- Increased operational situational awareness

Technology Needs

- Visual, Thermal & Multi-spectral sensors
- Small fixed wing, and rotor vehicles
- Autonomy
- Durability & Cost
- Systems of Systems Integration
- Operations Integration
- Training



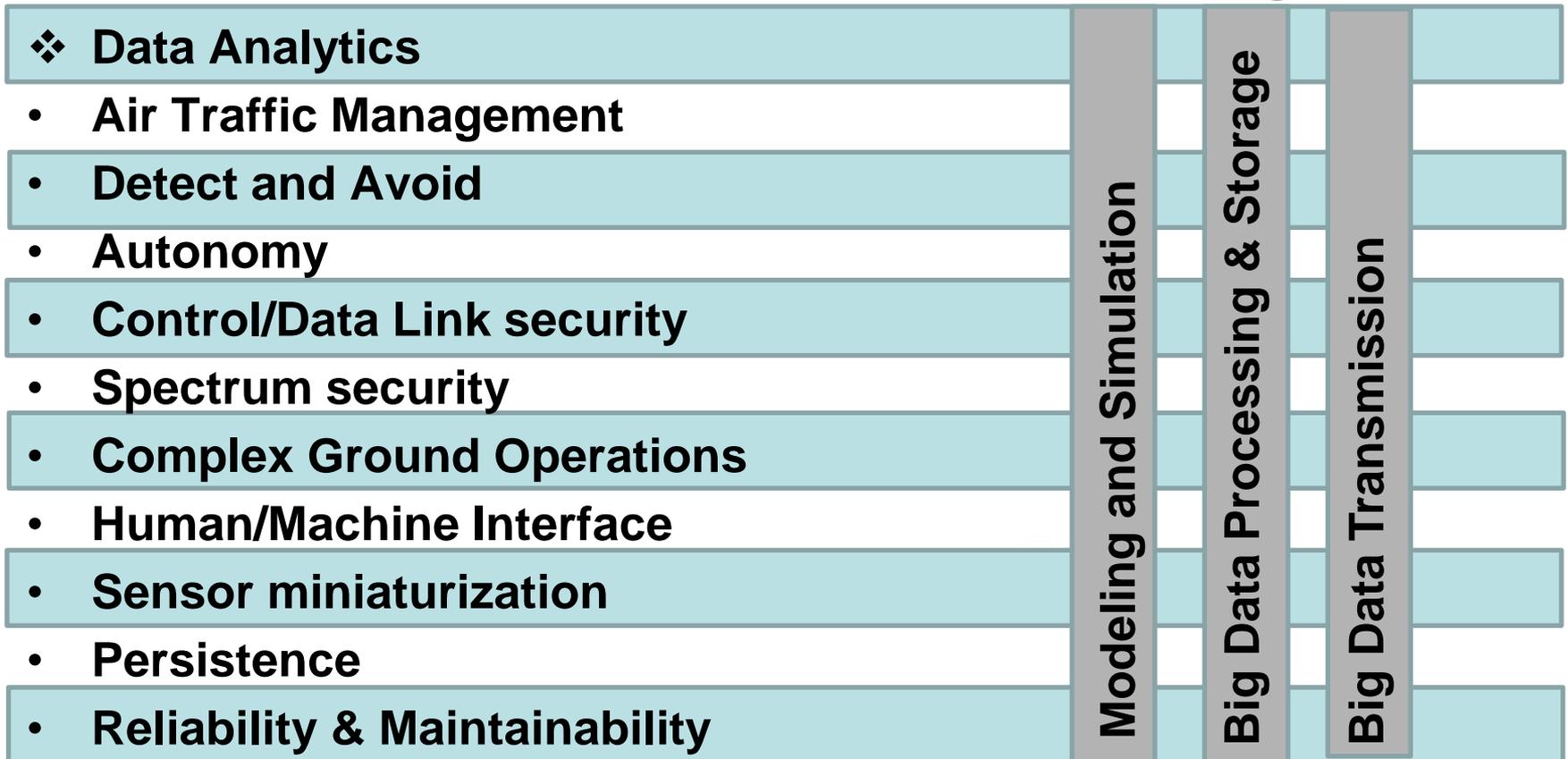
Advancing First Responder Capabilities

- **ODRC, ONG and ING - UASC established 1 FAA approved COA and has 2 pending COAs for 3 aircraft types supporting ops assessments**
- **ODRC, ONG, USAF and OSU - UASC established 7 FAA approved waivers and deployed aerostat with EO/IR sensor for ops assessments**
- **WSRI**
 - **Applied modeling and simulation to enable specification and placement of added surveillance equipment for ODRC**
 - **Presented assessment on SOTA cell phone monitoring and body sensor technology to ODRC**
 - **Planned for operational assessment at Lebanon/Warren Correctional Inst.**
 - **Assess fixed wing and rotor copter operational utility**
 - **Establish modern Command Center capabilities**
- **UDRI demonstrated modern tools for investigative research currently being deployed with Dayton Police Department**
- **Sinclair provided Ground School training to 10 ODRC employees**



Key Research Areas

Enabling Tools



Key Technologies

Knowledge Delivery

Big Data Processing

Rich Metadata with Heuristics

Domain Dashboard, Metrics & Standards

The money maker!!

Platform

Miniaturized sensors and avionics

High energy density (Li Air, Fuel Cell)

Composite Materials

Additive manufacturing

Aero designs optimized for Lower Re

Next Generation Technology

Integration into National Airspace System

Sense and Avoid

ADS-B

Secure Command & Control

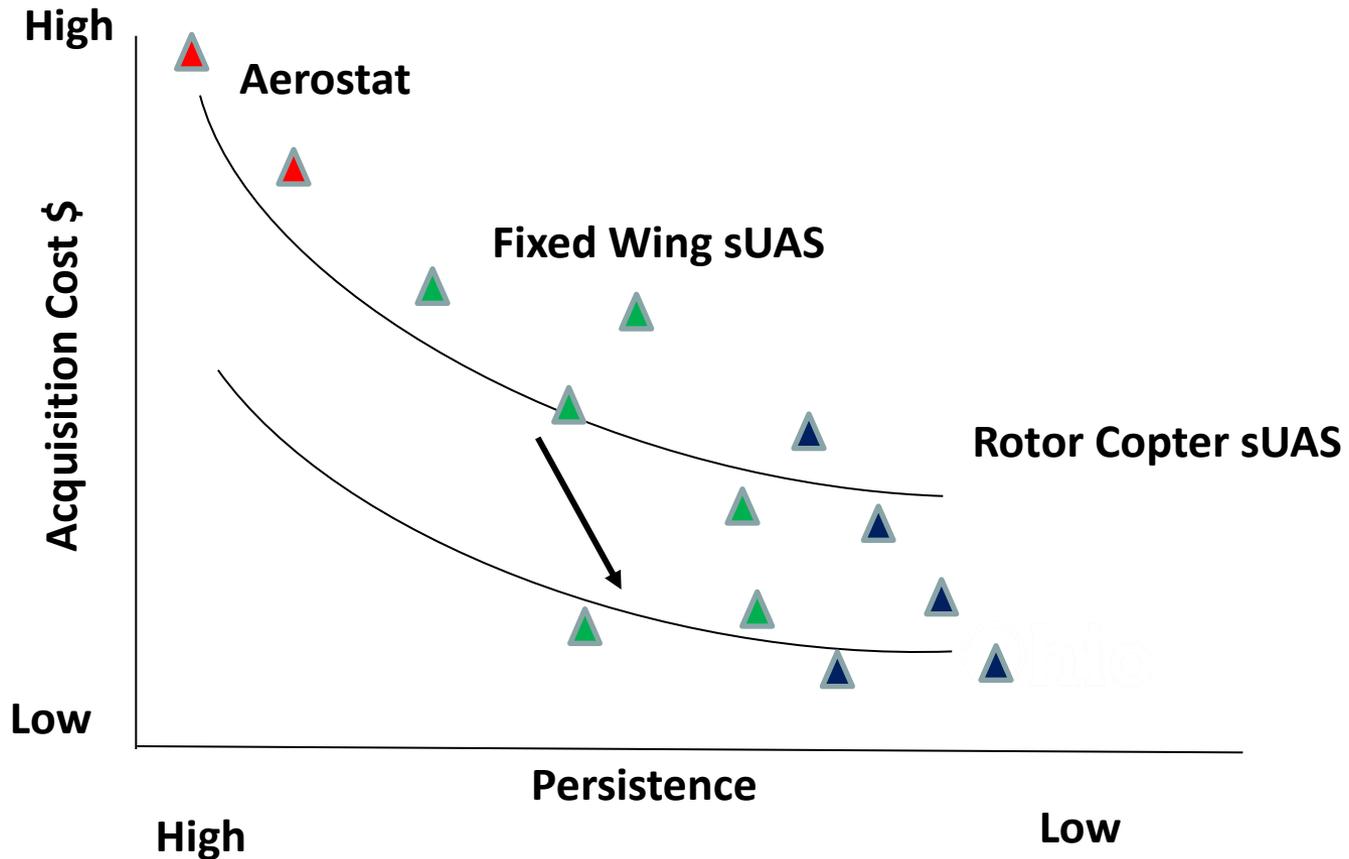
Autonomy

Human Factors

Enables FAA Policy to Evolve



Cost Trends



Order of Magnitude Decrease needed in sUAS System Costs



Advancing Aeronautical Research

- Sinclair building \$5M National UAS Training and Certification Center
- AFRL and UASC assessing GBSAA capabilities for beyond visual line of sight operations at Wilmington range
- University of Dayton pursuing Unmanned Autonomous Systems Verification/Validation Testing Center
- Wright State University – UASC established 1 FAA Approved COA for Modeling & Simulation research at Wilmington Air Park
- University of Cincinnati / University of Toledo
 - UASC processing 12 COAs with FAA for 5 aircraft types for flight testing at Wilmington Air Park and in West Virginia
 - UC accomplishing vehicle research for dynamic loading and autonomous landing
 - UC and Toledo conducting sensor research and data analytics for fire management
 - University of Cincinnati evaluating UAV Certification Center



Observations

- **Opportunity exists for promoting expanded UAS/remote sensing research funded by a diverse number of Federal Agencies**
- **Ohio research capabilities are strengthened by**
 - **Cross University collaboration**
 - **Cross disciplinary collaboration (e.g. engineering, business, law, etc.)**
- **UAS provides a premier platform for increased STEM activities**



STEM Opportunities

- **STEM motivators**
 - **Air Vehicle design and flight**
 - **Command and Control**
 - **Sensors and data management**
 - **Operational research**
- **K-12**
 - **Experiential flight opportunities**
 - **Science Fairs**
- **Community Colleges/Universities**
 - **Workforce development**
 - **Demonstration of theory**
 - **Applied research**
 - **Thesis support**



Summary

- **We are committed to assist Ohio in developing UAS potential**
 - Enable more efficient State Government
 - Support Universities to expand their research potential
- **Ohio bringing together needed collaboration across broad range of Federal, State University and Industry partners**
- **UAS potential is bounded only by imagination and creativity**
 - Significant research needed on applying technology to real world problem solving
 - Knowledge creation and delivery is key to value chain, but immature in most domain applications



Removal of Microcystin Toxins from Drinking Water

*ABS Solutions for the Mitigation and
Treatment of Algae Blooms*



May 14, 2015

Location: Wooster, OH

Employees: 17

Start Date: 2009

Status: Privately Owned



Origin: ABS Materials was founded to manufacture materials and further innovate on base swellable organosilica formulations discovered in 2005 at The College of Wooster.

R&D Staff: 2 PhD chemists, PhD Polymer Scientist, PhD Environmental Engineer, 3 support staff

Major Markets:

Drinking Water

Groundwater Remediation

Surface Water Treatment

Oil & Gas

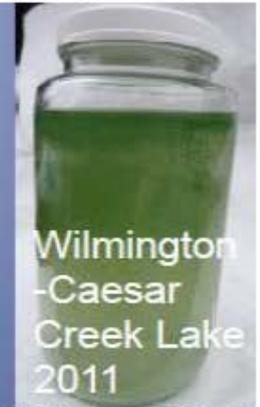
Personal Care Ingredients

Harmful Algae Blooms

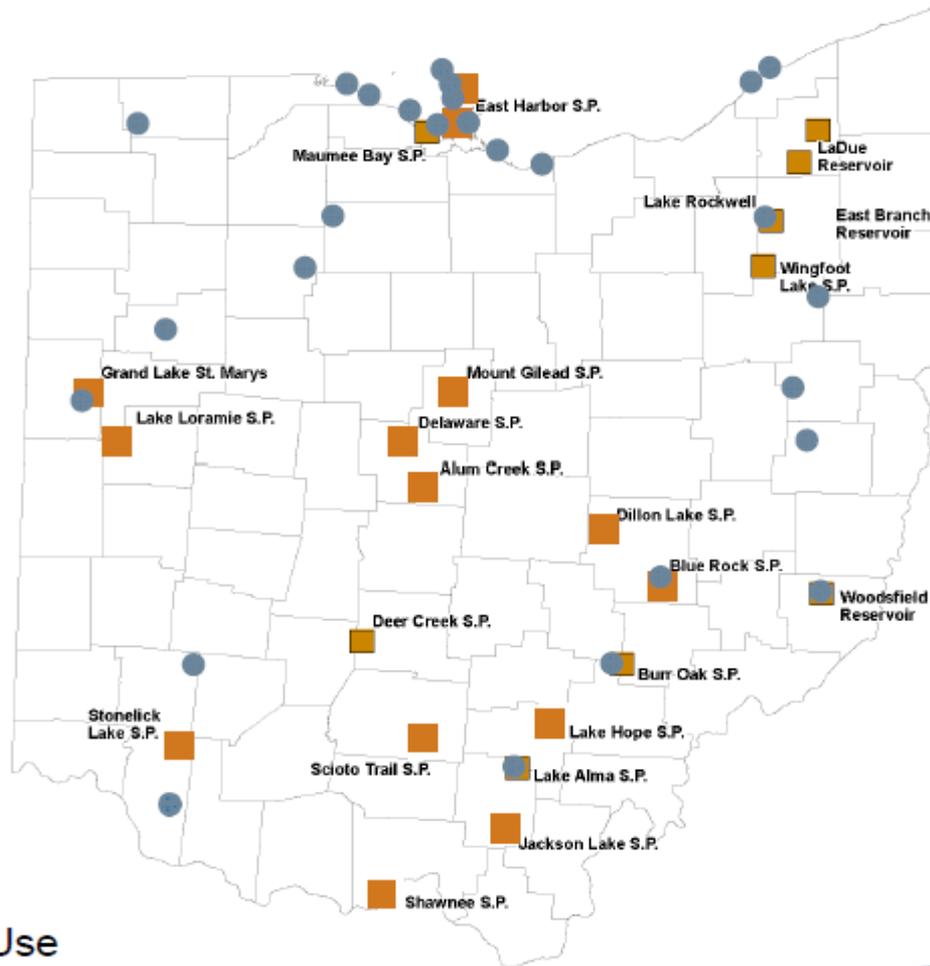
An Ohio Problem...



Examples of Harmful Algal Bloom on Ohio's Inland Public Water Supply Lakes and Reservoirs



Ohio Harmful Algal Blooms (2010-2012)



20 Public Water Systems with toxins in raw water

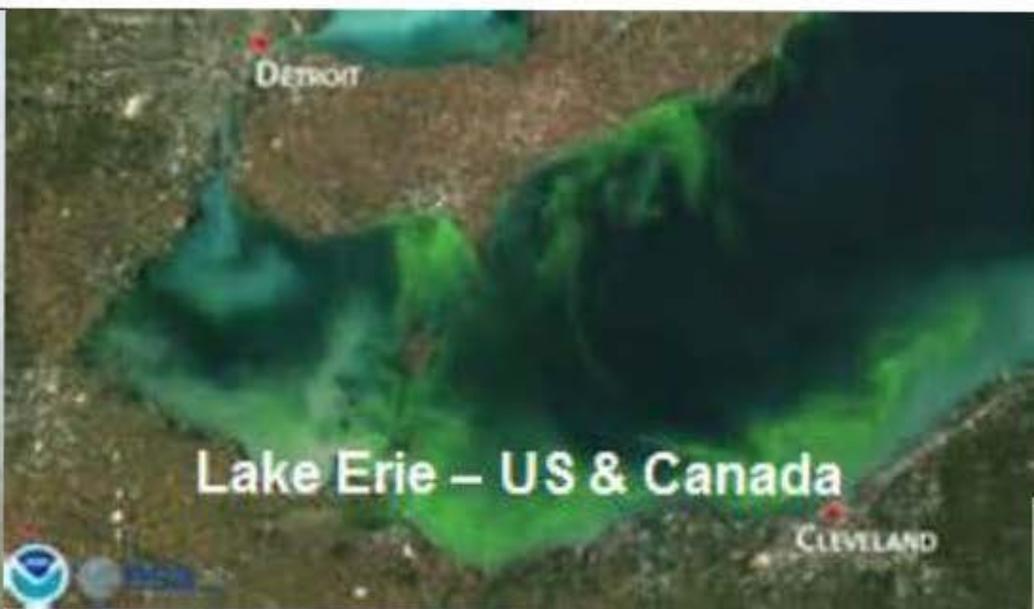
No Drinking Water Advisories



- Intakes with HABs
- Recreation Use Advisories

Harmful Algae Blooms

An Ohio Problem...



Harmful Algae Blooms and...A Global Problem



Algae Bloom Effects

Detrimental effect on fish stocks - hypoxia, dead zones.

Impact on tourism and water sports.

Algae toxins (microcystin) in drinking water.



Algae Bloom Causes

Urban Stormwater Runoff



Nutrient Runoff from Agriculture



Regulate farmers and seek to “out engineer” nature.

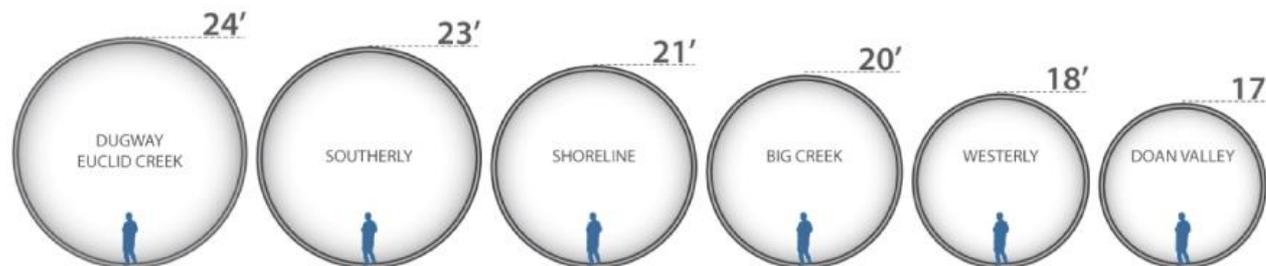
1. Nutrient application rules for agriculture.
2. Expensive ozonation treatment for lakeshore communities.
(\$10’s millions - \$100’s of millions)
3. Stormwater tunnels, NE Ohio Regional Stormwater District
(\$100’s millions - \$ billions)

How big will the tunnels be?

Our 25-year program to reduce Lake Erie pollution includes seven huge tunnel projects. Here are their finished diameters:



@neorsd
#neorsdECT
neorsd.org/cleanlake



HUMAN NATURE, INC.



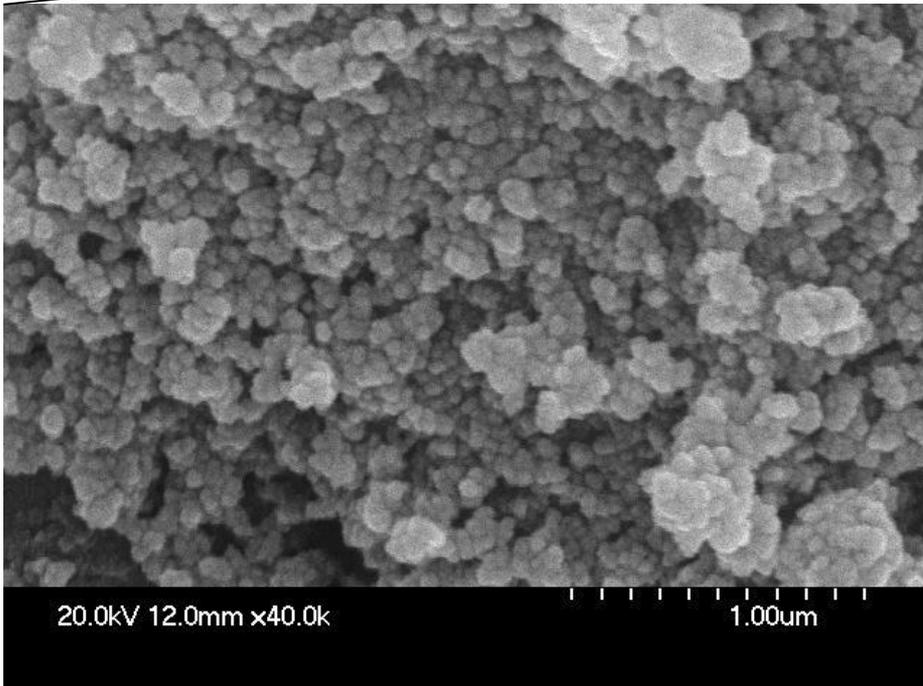
ABS Materials' Sustainable Approach

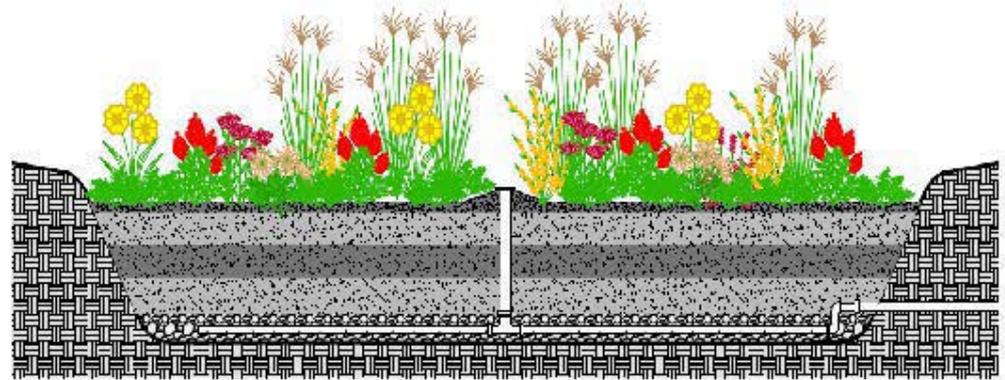
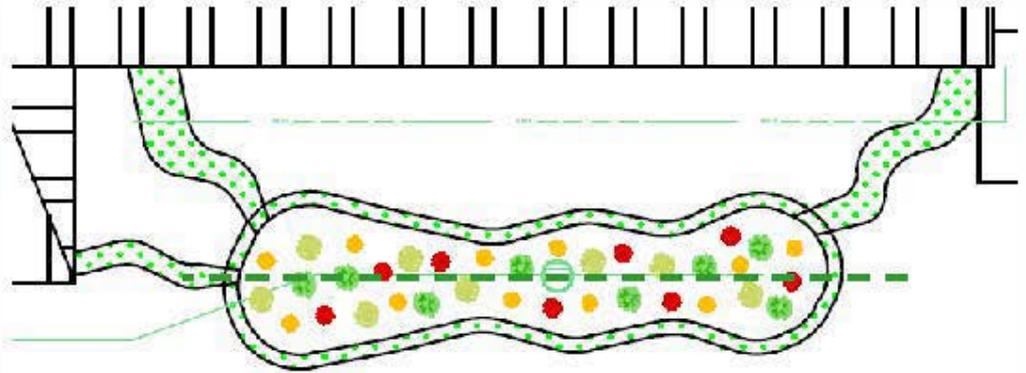
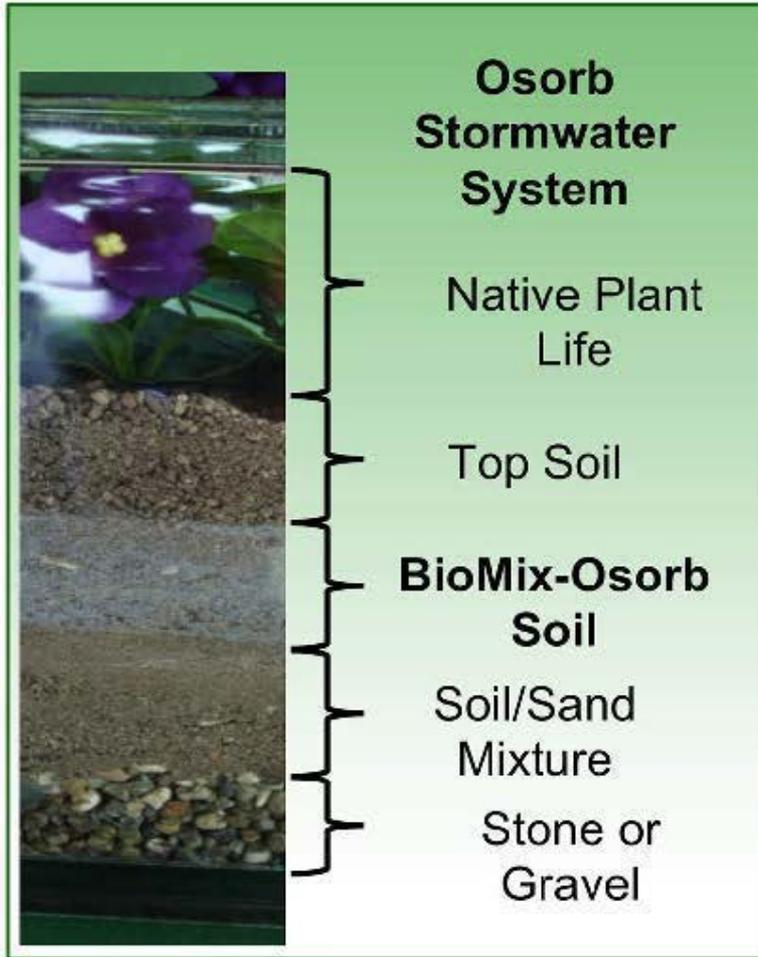
ABS Materials approach is to create advanced materials that **work with biology or mimic biological processes** to mitigate harmful algae blooms and their effects.

ABS Materials provides alternative solutions to algal blooms via:

- 1) **Prevention** using BioMax™ enhanced green infrastructure (Nitrate & Phosphate removal via bioswales, upflow filters, and permeable pavers)
- 1) **Spot Treatment** using MicroSorb™ Media

Osorb media is a class of engineered mesoporous organosilica absorbent medias.





Funding: NSF SBIR - Phase IIB Grant

BioMax™ Enhanced Bioswales for Stormwater and Ag Water



Treatment Performance (N and P removal)

Storm ID	Date	Peak Nitrate-N Concentration (mg/L)		Net Mass Removal ^a (%)	Peak Phosphate-P Concentration (mg/L)		Net Mass Removal ^a (%)	Reference
		Inlet	Outlet		Inlet	Outlet		
1	09-26-12	0.6	0.1	72	0.2	0.1	82	
2	10-18-12	877	4.6	94	800	1.9	98	Spiked ^c
3	10-27-12 ^b	840	19.9	41	746	8.9	52	Spiked ^c
4	11-12-12	0.5	0.1	78	0.2	0	99	
5	04-10-13	1	0.4	70	0.2	0	99	
6	04-19-13	865	9.3	82	788	5.3	92	Spiked ^c
7	04-24-13	0.8	0.1	86	0.2	0	99	
8	05-23-13	1.3	0.2	95	0.4	0	99	
9	06-10-13	1.8	0.2	91	0.1	0	99	
10	07-03-13	903	3.5	86	811	1.3	97	Spiked ^c
11	07-23-13	1	0.5	78	0.1	0	99	
12	08-07-13	1.4	0.5	71	0.1	0	99	
13	09-12-13	297	4.7	78	204	2.9	90	Spiked ^c

^a Net mass removal (%) for each runoff event performed by integrating hourly flow rate and concentration data collected from influent and effluent.

^b A 117 mm rainfall for 96 hrs.

^c Spiked solution consisted of nitrate (50 g N), phosphate (50 g P), atrazine (300 mg), and 2,4-D (300 mg) were added into the bioretention system during a rainfall event.

Treatment Performance (N and P removal)

Storm ID	Date	Peak Nitrate-N Concentration (mg/L)		Net Mass Removal ^a (%)	Peak Phosphate-P Concentration (mg/L)		Net Mass Removal ^a (%)	Reference
		Inlet	Outlet		Inlet	Outlet		
1	09-26-12	0.6	0.1	72	0.2	0.1	82	
2	10-18-12	877	4.6	94	800	1.9	98	Spiked ^c
3	10-27-12 ^b	840	19.9	41	746	8.9	52	Spiked ^c
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5								
6								
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12	08-07-13	1.4	0.5	71	0.1	0	99	
13	09-12-13	297	4.7	78	204	2.9	90	Spiked ^c

SuperStorm Sandy: 4.6" inch rainfall...
Still 40-50% removal of nitrate, phosphate!

^a Net mass removal (%) for each runoff event performed by integrating hourly flow rate and concentration data collected from influent and effluent.

^b A 117 mm rainfall for 96 hrs.

^c Spiked solution consisted of nitrate (50 g N), phosphate (50 g P), atrazine (300 mg), and 2,4-D (300 mg) were added into the bioretention system during a rainfall event.

Microcystin is a primary toxin that is produced by harmful algae blooms.

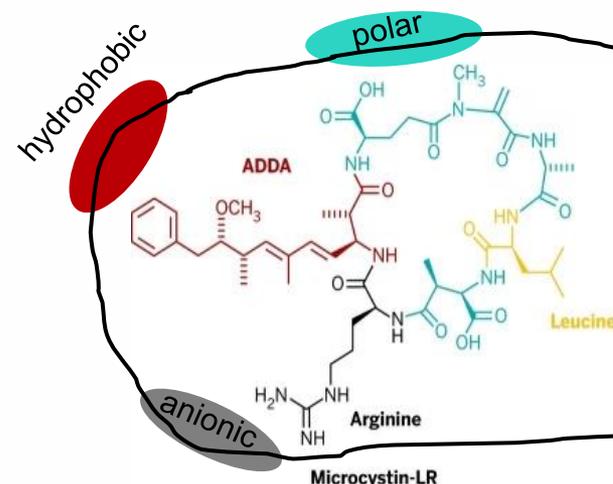
Last week (5/7/2015) U.S. EPA indicated that water with levels greater than **1 ppb** should not be used for drinking water.

ABS Materials has developed a specialized media to treat microcystin contaminants based on biomimic design.

MicroSorb™ Media

Mimic the sites in the body that microcystin targets.

Microcystin binds to MicroSorb pores strongly, purifying the water.



Media	Dosage (mg/L)	Percent Treatment	Bound Microcystin (ug/g)
GAC, Norit 1240W	2,000	40	6.9
ENVI-Carb™	200	46	110
ABS Materials MicroSorb™ media	200	98.1	243

- Algae toxins are going to be an increasingly common issue in Ohio and throughout the world
- Preventing nutrient runoff from entering water resources is the first line of defense

This can be accomplished using BioMax™ Green Infrastructure Solutions.

- Microcystin can be treated using MicroSorb™ Media

This will provide solutions that are not feasible with standard water treatment practices.

Thank You!

Contact:

Mr. J. Gary McDaniel, CEO, g.mcdaniel@absmaterials.com



Attachment #4

Choose Ohio First & Engineering Entrepreneurship:

STEM Culture-Building Equals Student Success



Briana Hervet, Ph.D., Ohio Board of Regents
bhervet@regents.state.oh.us

Brian Randolph, Ph.D., The University of Toledo
Brian.Randolph@utoledo.edu

Ohio | Board of Regents

University System of Ohio

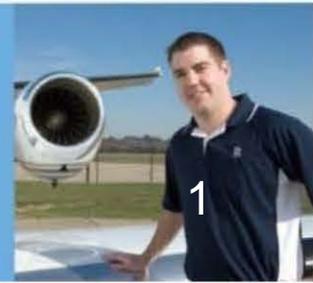




 Choose Ohio First

 UNIVERSITY OF Cincinnati

Choose hio First





What is Choose Ohio First?

- A premier model of recruiting and retaining students in STEMM and STEM education
- A program to support increased participation in STEM disciplines
- An opportunity for students to benefit from early connections to business and industry – including awareness and readiness activities, co-ops, internships, and collaborations with businesses solving real-world problems



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Choose Ohio First Student Selection

- Not solely need-based
- Not solely merit-based
- Students must meet campus entrance requirements for their particular major
- Students must complete program-specific activities
 - Research projects
 - Mentoring from a faculty member
 - Progress toward completion

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Choose Ohio First Campuses

Statewide Effort for STEM Success



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University System of Ohio





Choose hio First

By the Numbers

- **Numerous programs** around the state
 - Woodrow Wilson Teaching Fellowships
 - Primary Care Scholarships
- **48 public and private colleges and universities**
- **Nearly 6,000 COF Scholars** across Ohio
 - Ohio residents
- **Over 200 majors, minors, and certificate programs**
 - Undergraduate, graduate, professional

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Assessing the Impact of COF

- Enrollment (Recruitment)
- Persistence
- Graduation/Completion
- Degree program participation
 - Drives participation in key areas





Choose Ohio First Evidence of Success

- COF students:
 - Stay enrolled
 - Are more likely to graduate
 - Earn more credits
 - Stay here to work/learn!

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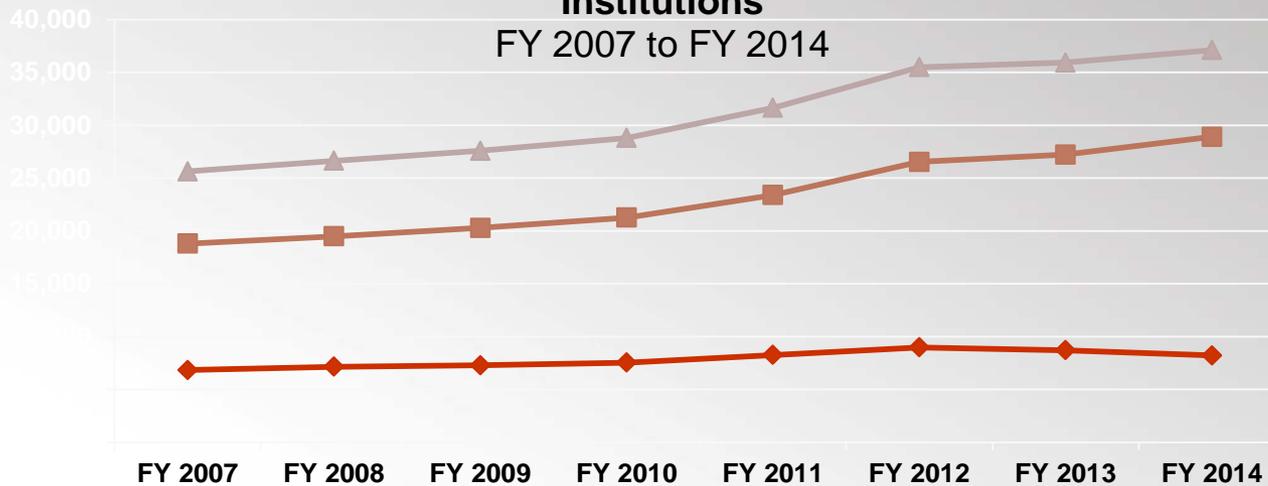




Choose Ohio First Evidence of Success

STEMM Degrees Awarded at University System of Ohio Institutions

FY 2007 to FY 2014



Board of Regents

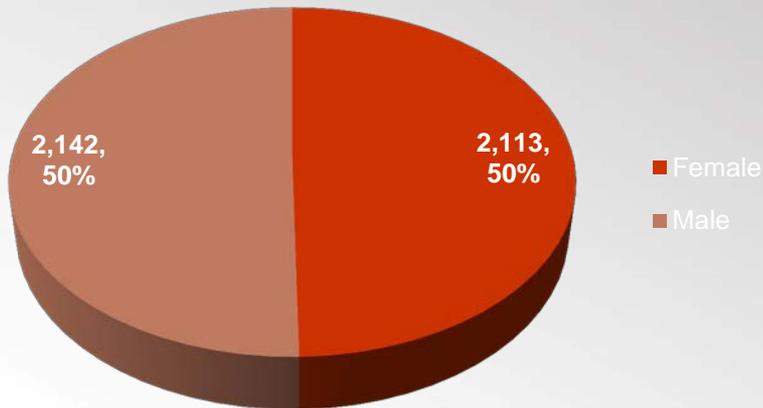
University System of Ohio





Choose Ohio First Evidence of Success

2014 Choose Ohio First Student Gender



Board of Regents

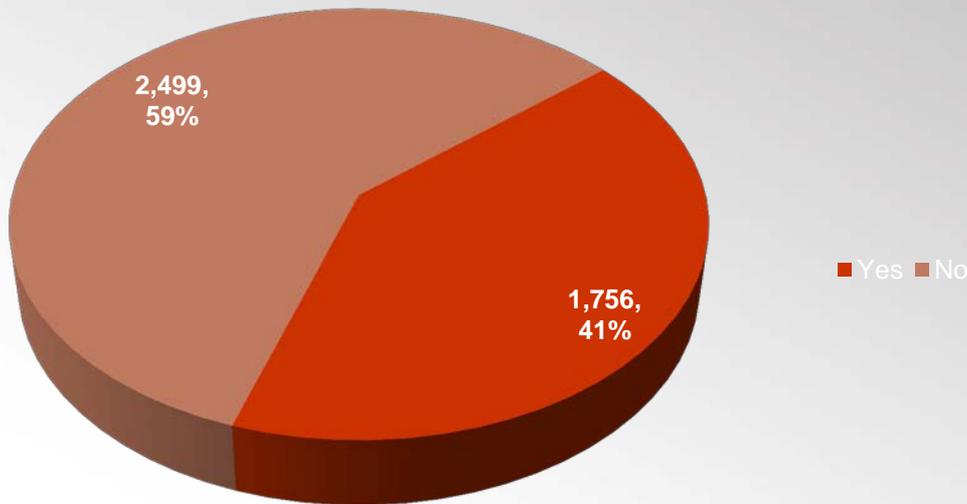
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Choose Ohio First Evidence of Success

2014 Choose Ohio First - First Generation



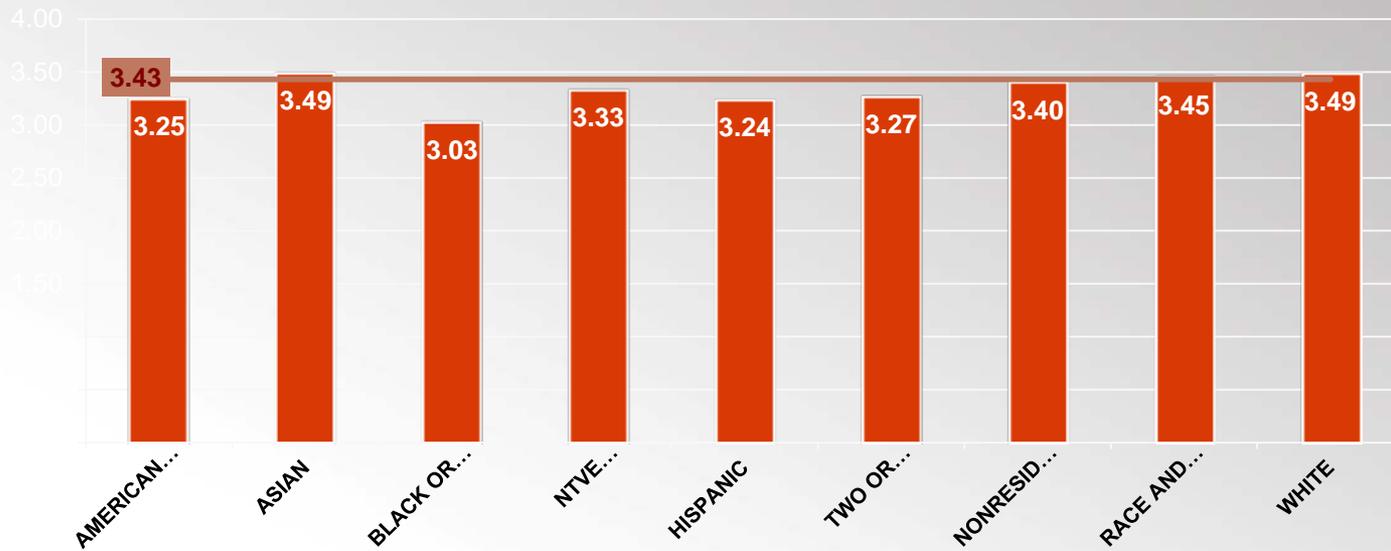
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Choose Ohio First Evidence of Success

2014 Choose Ohio First - Average Student GPA by Race/Ethnicity



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Choose Ohio First Benefits of Participating

- Workforce Development
- Economic Development
 - Projected economic impact
- Career Exploration and Awareness for Students
- Effective use of resources (public and private)
 - Matching funds generated
- Building a culture/community of Scholars



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Building a Student Culture of Engineering Entrepreneurship

Programs

Curricular and extra-curricular opportunities for students and mentors

Places

Creative environment to foster innovation

People

Students, faculty and sponsors with the desire and skills to participate



Programs

- Engineering Technopreneurship Initiative
- Freshman design through senior commercialization
- Freshmen Engineering Entrepreneurship Development (FEED)
- Bioengineering Design Club
- Young Entrepreneurs Society (YES)
- Minor in Entrepreneurship, Family and Small Businesses
- Annual Angel Pitch competition
- LaunchPad Incubation



FEED



Freshman Engineering Entrepreneurship Development

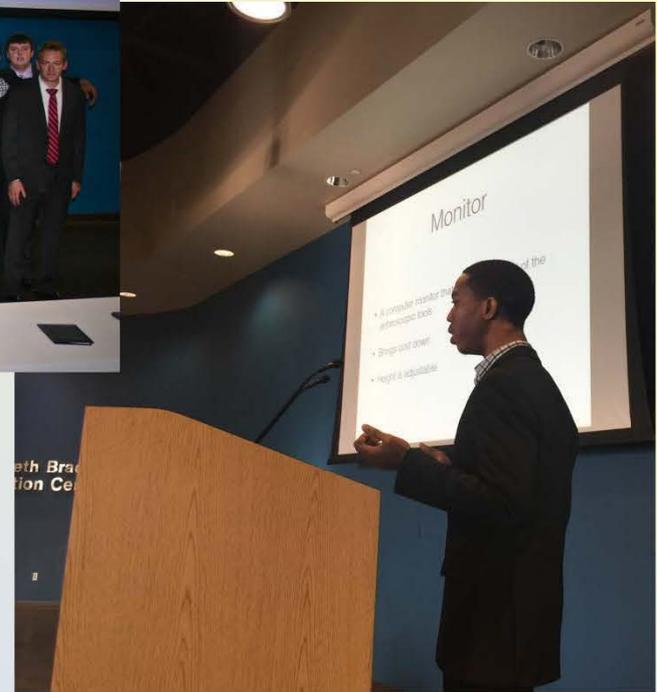


COLLEGE OF ENGINEERING
THE UNIVERSITY OF TOLEDO



Current Problems

- slipping
- uncomfortable
- strain
 - Spine
 - Shoulder
 - Wrists



CROWDSAGE
INsight



COLLEGE OF ENGINEERING
THE UNIVERSITY OF TOLEDO

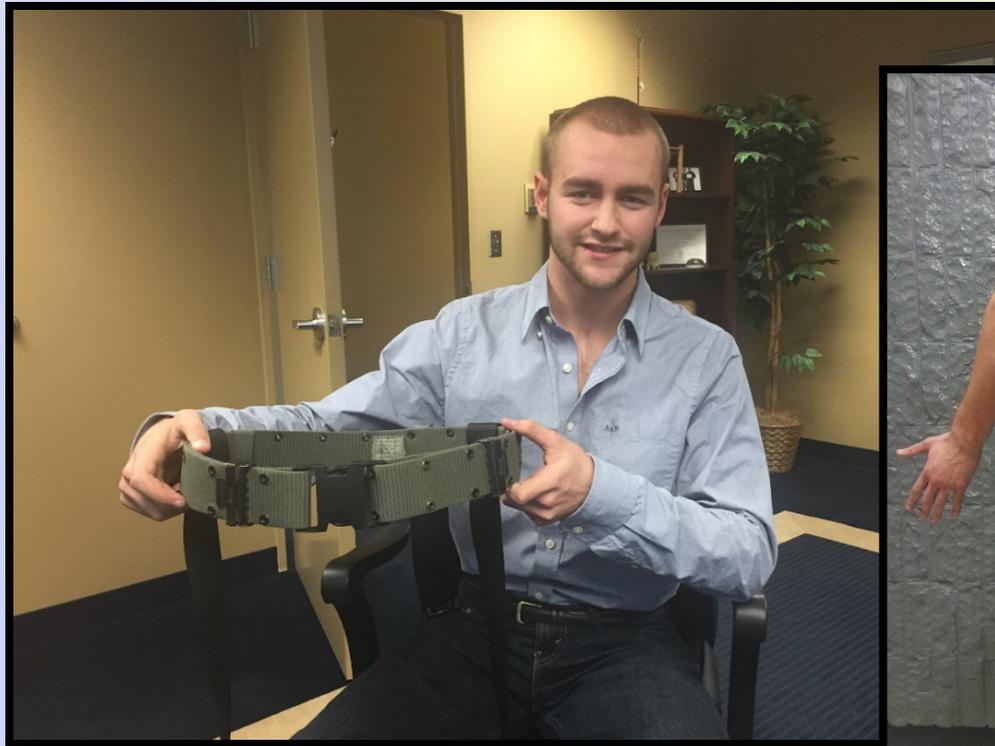
Angel Pitch 2.0



Angel Pitch Winner

Silver Back Casualty Extraction Kit

Joe Strobbe, Mechanical Engineering Freshman



Places

- Thomas and Elizabeth Brady Engineering Innovation Center
- Nitschke Technology Commercialization Complex
 - CoSpace
 - Maker Space(s)
 - LaunchPad tenant spaces

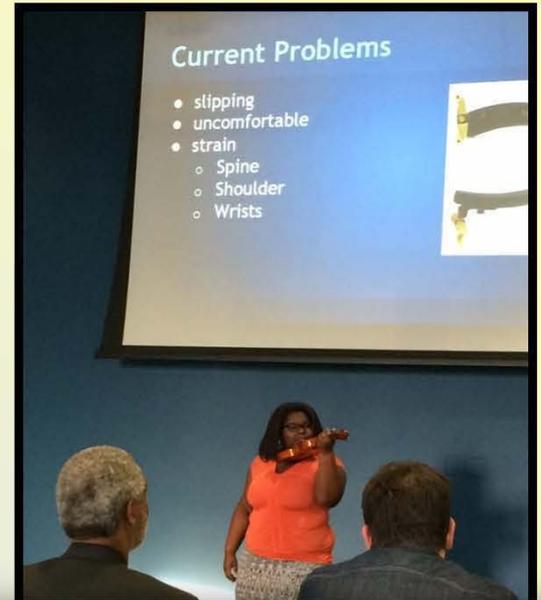
A Physical & Thematic Transformation of the Engineering Campus

UT Engineering Complex, 2008



“Advanced Energy & Materials
Theme Park” 2015





Student Commercialization

Hephaestus Limited

(Fire Fighting Drone Technology)



Kyle Lentz
Co-founder & CTO

Connor Kress
Co-founder & CEO

People

- Choose Ohio First For Engineering Entrepreneurship (COFFEE) Scholars
- ENGR-1000 and Capstone instructors
- College of Business and Innovation faculty
- UT Maker Society
- Technopreneurship Fund benefactors
- Entrepreneur in Residence
- NSF Innovation Corps (UT/UM I-Corps)
- LaunchPad Innovation leadership

Choose Ohio First for Engineering Entrepreneurship (COFFEE) [COFSP 08-27]



The University of Toledo (lead)
The Ohio State University
Stark State College of Technology
Lorain County Community College
Owens Community College

UT COFFEE Overview

The primary objective of COFFEE is to increase the number of Ohio engineering and science graduates, equipped with the entrepreneurial training and co-op experiences needed to translate their innovative ideas into economic growth for Ohio companies in high-tech industries that are important to Ohio's future.

- Engineering, Engineering Technology, Chemistry and Physics majors are recruited.
- Five cohorts totaling 110 UT students to date.
- 38 graduates through May 2015.
- All pursuing the Entrepreneurship, Family and Small Business Minor.
- Recipients do three or more co-op semesters (240 placements for 83 students through spring 2014; over 55 Ohio employers; synergy with OMIC).

Sampling of Ohio employers:

B-K Tool & Design Inc.
Campbell Soup Company
Civil Engineers of Southwest Ohio (CESO)
Crown Equipment Corporation
Daavlin, Inc.
Digital Prairie
Duke Energy
Durable Corporation
Eaton Corporation
Emerson
First Energy Corp.
First Solar
Hendrickson
Honda
IET, Inc.
INEOS Nitriles
JDRM Engineering, Inc.
Keithley Instruments, Inc.
Koester Corporation
Lubrizol Corporation
Marathon Petroleum Company LLC
Materion Brush
Matrix Technologies, Inc.
ME Companies
NASA
Northeast Ohio Regional Sewer District
Ohio Department of Transportation
Ohio EPA
Olympus Corporation of the Americas
Owens-Illinois
Parker Hannifin
Perstorp Polyols
Premier System Integrators
R.R. Donnelley & Sons
R.W. Beckett Corporation
Ridge Tool - Division of Emerson Electric
Rowmark
Rudolph/Libbe
Sauder Woodworking
Sigma Technologies
SSOE Group
Steris Corporation
Style Crest Inc.
Swagelok Companies
Therma-Tru Corporation
TNS - NFO WorldGroup
Toledo Refining Company
Toledo Zoo, The
U.S. Air Force
United Parcel Service (UPS)
US Endoscopy
University of Toledo
Valtronic USA, Inc.
Wasserstrom and Bros.

COFFEE Outcomes

38 graduates through May 2015

- 18% first generation
16% female
11% underrepresented minorities
- 29 completed minors in *Entrepreneurship, Family and Small Business*.
Several start-ups, non-profits, business plans and patent applications.
- 100% did at least three co-ops.
Numerous placements at OMIC partner employers.
Activity/employment in these JobsOhio key sectors: *Automotive, Advanced Manufacturing, Energy, Information Technology, Business Functions, Biohealth, Financial Services*.

COFFEE Profile

Jordan Keefe, BSChE, 5/2014

Project Manager, IRISense, LLC, Toledo, OH (a BioOhio start-up)

Founder and President, *Save the Feet*, 2014 Jefferson Award Champion

“The skills I learned in the EFSB minor are what enabled me to successfully launch my 501(c)3 organization. It is also what has kindled a fire that has led to a provisional patent for another one of my ideas. Lastly, it is what has landed me the job with the start-up company I am currently working for.”

“I also applied for a patent around a new type of ice chest that a fellow COFFEE Scholar and I designed. I also worked at a local incubator and have been around the start-up community very heavily.”

“Utilizing many of the skills I have learned in the entrepreneurship courses, I have successfully grown these organizations into successful ventures that are based around service and donations. The skills I learned have proven to be invaluable to me. “



Receiving 2014 Jefferson Award

COFFEE Profile

Michael Koludrovich, BSME 5/2013, MSME 5/2014

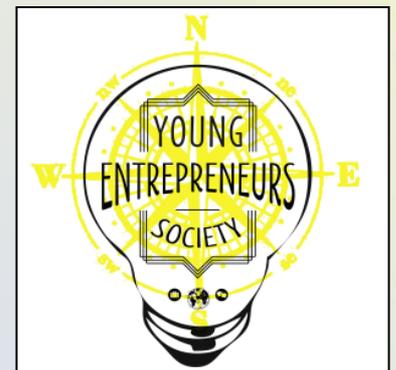
Design Engineer, Thorson Baker + Associates, Inc, North Royalton, Ohio

Founder and Past-President, *Young Entrepreneurs Society*

“I plan on remaining involved in my own entrepreneurial ventures for the rest of my life.”

“My entrepreneur background is the most rewarding experience for me. It inspired me to start the Young Entrepreneurs Society (YES) here at UT. I also am currently working on a few different business plans and have entered and competed in multiple start up competitions. I have also spent much time at the Nitschke Technology Commercialization Complex working with starting FEED (Freshman Engineering Entrepreneurship Development Club) for connecting freshman Engineering students with entrepreneur resources and joining that club as a gateway into Y.E.S.”

“I am always telling new freshman about this scholarship and how I have loved my experience.”



COFFEE Profile

Jason Owens, BSCSE and BSEE, 12/2012

President, *Resonance Group, USA*, Toledo, Ohio

“I already started the business while in school and was in the process of product development, along with participation in the various business plan competitions offered on campus at UT.”

“I had a lot of help from Dr. Nagi and the UT business incubator, along with Dr. Sonny Ariss who all played an instrumental role in helping me to establish my business and give me practical guidance to get things moving forward.”

“I have since been continuing to build my company by working on collaborative projects with other people in the same field, and designing new products to take to market.”

***Resonance Group* has recently completed product design, development and production of electronic controllers for *Grypshon Industries*, another UT student/alumnus start-up. *Resonance Group's* latest technology is an optical dissolved phosphorus sensor for real-time monitoring of toxic algae potential in drinking water sources and distribution systems. Full production may entail becoming a tenant in LaunchPad Incubation, the UT STEM incubator.**





Thank you!

Choose hio First

For more information visit:
www.chooseohiofirst.org

 Board of Regents

University System of Ohio





 **HIO G.R.E.A.T**

Global Reach to Engage Academic Talent





Chancellor John Carey's Recommendations for
**OHIO'S POSTSECONDARY
GLOBALIZATION INITIATIVE**

A REPORT PREPARED BY THE OHIO BOARD OF REGENTS

Pursuant to H.B. 484,
the Chancellor
submitted his
Report and
Recommendations to
the Governor &
General Assembly on
December 31, 2014.





Objectives & Highlights

 **OHIO G.R.E.A.T.**

Global Reach to Engage Academic Talent

- Promote Ohio as a postsecondary destination globally;
Grow international postsecondary population from 4.1% to 6%
\$420 million increase to \$1.2 billion and support additional 5,751 jobs
- Encourage international students to remain in the state and engage in the workforce; and
Increase international students' rate of securing OPT with Ohio business to 50%
\$95.1 million generated and support 1,200 jobs
- Enhance global economic opportunities for Ohioans
Create "Ohio-G.R.E.A.T." domestic student mobility grant as a capstone experience.



Ohio

Board of Regents
University System of Ohio

GLOBALIZATION INITIATIVE



What We Are Doing



We are developing new ways to demonstrate, globally, that Ohio values higher education and its relationship to economic competitiveness and innovation. Our state has prioritized Global Reach to Engage Academic Talent in study and in business.





Our message...

 **OHIO G.R.E.A.T**
Global Reach to Engage Academic Talent

Ohio delivers world-class higher education that drives business innovation, improves lives and creates prosperity in a global market.



 **Ohio**

Board of Regents
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GLOBALIZATION INITIATIVE



Immediate Activities



Immediate Activities Beyond Ohio:

- www.Ohio-GREAT.us
- International Education Conference (NAFSA)





3D Render



Ohio

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GLOBALIZATION INITIATIVE

Connecting & Hosting, Globally



OHIO G.R.E.A.T.
Global Reach | Engage Academic Talent

Arrange your G.R.E.A.T.[™] visit to Ohio!

- * Ohio's cost-of-living is among the lowest in the United States
- * Ohio is within an 8-hour drive of 50% of the U.S. population
- * Ohio has more than 200 accredited institutions of higher education

Help us to learn what factors are important to your student-clients by answering the following:

Faculty to student ratio	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know
Campus student population of	<input type="checkbox"/> <5,000	<input type="checkbox"/> 5,000-10,000	<input type="checkbox"/> 10,000-20,000+
Housing options	<input type="checkbox"/> On campus	<input type="checkbox"/> Off campus	<input type="checkbox"/> Both
Campus location	<input type="checkbox"/> Urban	<input type="checkbox"/> Rural	<input type="checkbox"/> Small city
Access to public transportation	<input type="checkbox"/> Very important	<input type="checkbox"/> Not important	<input type="checkbox"/> Somewhat important
Cost of living	<input type="checkbox"/> Very important	<input type="checkbox"/> Not important	<input type="checkbox"/> Somewhat important
Access to varied religious affiliations	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know
High speed access to data, research, and information	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know

Is there a particular Ohio region or attraction that your students associate with Ohio? If so, what is it?
 Other: _____

Your contact information:
 Name: _____ Title: _____
 Education Organization: _____
 Profession: College Secondary school International education counselor
 Foreign dignitary Other (please describe): _____
 Mailing Address: _____ Country: _____
 Phone: _____ Email: _____

Please provide me more information about arranging my G.R.E.A.T. visit to Ohio! Yes No

A GREAT place to Study, Work, and Live.



Located in the eastern non-humid US, Ohio is known for its diverse landscapes, lakes and waterways, professional sport teams and its innovation economy. Ohio is ranked in the seventh most populated state in the U.S.

For more information, please visit
OHIO-GREAT.US

Ask me about FREE lodging during your G.R.E.A.T. visit to Ohio!





Immediate Activities



Immediate Activities Within Ohio: We are....

- Exploring practices and “assets” of postsecondary – government – business – community;
- Innovating collaborations focused on a unified comprehensive message about Ohio.
- Planning state roll-out and regional action plans





OHIO G.R.E.A.T
Global Reach to Engage Academic Talent

Who are the “We”

State-level	Statewide
Ohio Board of Regents, Chancellor <ul style="list-style-type: none">• Globalization• OARnet• Workforce Development• Academic Affairs	All USO institutions 14 Universities + 23 Comm. Colleges
Governor’s Office of Workforce Transformation	22 private institutions of higher education
Development Services Agency <ul style="list-style-type: none">• Tourism• Export• Third Frontier	Cities: Cincinnati Cleveland, Columbus, Dayton, Toledo
OhioMeansJobs (JFS)	Ohio Chamber of Commerce
JobsOhio	JobsOhio Regional Network: NW (Toledo), NE (Cleveland/Akron-Canton/Youngstown), W (Dayton), SW (Cincinnati), SE (Nelsonville), Central (Columbus)



Critical Foundation

 **OHIO G.R.E.A.T**

Global Reach to Engage Academic Talent

Revisiting the objective of *encouraging international students to remain in the state and engage in the workforce.*

- **Federal Regulations**
- **Reflective Practices**





For YOUR Consideration

OHIO G.R.E.A.T
Global Reach to Engage Academic Talent

2 *Encourage Ohio's International Postsecondary Students to Remain in the State Beyond Their Study*



2. The Chancellor will adopt an **Ohio Board of Regents' resolution** asserting that state-level policy interests are advanced when each postsecondary institution in the state:
- Provides a global context for academic learning that expands students' scope of knowledge and preparation to succeed in global economic environments;
 - Considers its educational mission and its commitment to advance its international and domestic students' global economic competitiveness;
 - Commits to support policies and practices that nurture welcoming classrooms, other campus and community environments in which students from around the world experience a sense of value and contribution to life in Ohio.



Ohio

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University System of Ohio

GLOBALIZATION INITIATIVE



Your Thoughts....

 **OHIO G.R.E.A.T.**

Global Reach to Engage Academic Talent



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