

IHMC Board of Directors Meeting Minutes
Monday, December 3, 2018
8:30 a.m. CST/9:30 a.m. EST Meeting

Roll Call Chair Bill Dalton

Chair's Greetings Chair Bill Dalton

Action Items

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| 1. | Approval of September 17, 2018 minutes | Chair Bill Dalton |
| 2. | Discussion on IHMC Financials and 990's | Director Dick Baker |
| 3. | Discussion and Approval of Fiscal 2018 Audit | Director Dick Baker |

Chief Executive Officer's Report

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| 1. | Research Update | Dr. Ken Ford |
| 2. | State and Federal Legislative Update | Dr. Ken Ford |

Adjournment

IHMC Chair Bill Dalton called the meeting to order at 8:30 a.m. CST. Directors in attendance included: Dick Baker, Carol Carlan, Bill Dalton, Ron Ewers, Eugene Franklin, Hal Hudson, Jon Mills, Eric Nickelsen, Mort O'Sullivan, Jay Patel, Alain Rappaport, Jim Reeves, Ray Russenberger, Martha Saunders, Gordon Sprague and Glenn Sturm. Also, in attendance were Ken Ford, Bonnie Dorr, Ryan Tilley, Ronnie Armstrong, Alan Ordway, Matt Doster, Jeff Hartley and Julie Sheppard.

Chair Dalton welcomed and thanked everyone who was there that morning both in person and to those who dialed in.

Chair Dalton began his comments by informing the Board that the IHMC Powered Exoskeleton was featured on the cover of the latest issue of Technology and Innovation: "Technologies for Disabilities" put out by the National Academy of Inventors. He explained that this was a double issue released November 28, 2018 that is focused on exploring the importance and need for innovators and inventors to develop technologies that will help restore or improve function for people with disabilities, as well as enhance their relationship with their environments and peers. He added that the IHMC Event Data Visualization is also prominently featured on the Innovation in Action page of the same publication. He informed the Board that Alan or Julie would send everyone a copy of the cover page and the article.

Chair Dalton then explained that at the meeting today there were 3 items to discuss followed by Dr. Ford's report.

He began by discussing Action Item 1, the September 17, 2018 Minutes and asked the Board for a motion to approve. Director Sprague moved approval followed by a second from Director Baker. The motion to approve the September 17th minutes carried unanimously with no discussion or edits.

Chair Dalton the introduced Agenda Item 2 and asked Dick Baker, IHMC Chair of Finance and Audit to discuss the current financials and the recently filed 990. Director Baker discussed the strength of the current financials and reflected upon the increases and successes of IHMC when compared to historical data. He explained that the 990's were filed and in good order and offered to take any questions from the Board.

There being no discussion regarding the financials, Chair Dalton asked Director Baker to address Item 3, the Fiscal 2018 Audit from Saltmarsh Cleveland & Gund. He informed the Board that everyone should have received a draft copy of the independent audit in your package. Director Baker commented on the clean audit congratulating the IHMC staff. He explained that administrative expenses were down to 17% and commended IHMC on running a tight ship. Director Patel moved approval of the 2018 Audit and Director O'Sullivan seconded and the motion passed unanimously.

Chair Dalton thanked Director Baker for his report and work on the financials. Chair Dalton then asked Dr. Ford to provide his report.

Dr. Ford began his comments by thanking all of the Board members for participating in The board meeting, thanking those here in person as well as those on the phone.

He began his comments by announcing that on November 8, the Board of Governors of the State University System unanimously approved the UWF-IHMC joint PhD in Intelligent Systems and Robotics. He explained that both he and Martha Saunders were both present and that it is a fair statement to say that the program was enthusiastically approved and that the UWF-IHMC joint PhD program has received excellent press. He remarked that Director Jay Patel was present in his role as one of the Florida Board of Governors and was very helpful and supportive to the cause.

Director Patel commented that the program was good for Florida and that he was pleased to assist and he added that staff at the Florida Board of Governors was very enthusiastic about the program.

Dr. Ford then announced that IHMC's collaborative Triumph proposal was on the agenda for review on Friday December 7th at the Board meeting in Defuniak Springs. He explained that this proposal involves the City of Pensacola, UWF, the Pensacola and Perdido Bays Estuary Program, Florida Fish and Wildlife Commission, Visit Pensacola; the Naval Surface Warfare Center and the Naval Experimental Dive in Panama City and the Air Force Research Laboratory (AFRL). He commented that the private sector committed investors in technology transfer include Cobalt Intelligence LLC and Pensacola Bay Oyster Company. He added that this proposal was unique in that it allows for the synergy and blending of high wage creative researchers, scientists and business

people from diverse organizations to mix, mingle and work together to innovate and develop technologies to grow our local economy. He added that the proposed Center would showcase Northwest Florida as a regional center in the growth of ocean research high wage jobs and innovative technology developments. He added that if recommended for funding, the infrastructure component of the project includes the design, permitting and building of a 36,000 square foot research and technology facility at the Port of Pensacola.

He explained that the first floor of the envisioned facility includes small private lab spaces for principal partners and a large middle center area for collaborative research design and development, fabrication, 3D printing and large equipment. He continued by describing that a visitor kiosk would be operated by Visit Pensacola and that it is anticipated that visitors to the community and field trips will occur on a regular basis. He commented that the second floor would include office space, conference rooms, printing area, bathrooms and breakroom facilities that can be shared by CDOT partners. He explained that the total request is \$15 million with match from every partner involved and the overall goal to create high wage technology jobs and grow new research funding in the undersea arena. Dr. Ford added that the Center will offer experiential learning opportunities in ocean technologies and marine sciences including workforce career academies, high school and college internships, and local school field trips.

Continuing the discussion, Dr. Ford commented that IHMC's part will focus on undersea research and technology development that includes a human research component that will focus on next-level molecular research and biotechnology for improving safe and efficient human and human-machine research in the undersea environment. He stated that Dawn Kernagis, Matt Johnson, David Fries, and Tim Broderick will be key research scientists, among others, involved in this Center adding that we expect that the Center will be beneficial to the new joint PhD program in Intelligent Systems and Robotics.

He explained that should this proposal be selected for funding, IHMC will act as lead partner and fiscal agent for the entire project and will assume responsibility for reporting to the Triumph Board. He added that IHMC will establish a contract with all partner entities that utilize the facility to include appropriate rent and common area fees that allow the Center to operate, pay utilities and be well maintained and that IHMC will also coordinate with all Center partners for reporting to the Triumph Board on job creation, federal and private sector research dollars leveraged, patents filed, technology transfer opportunities, new company formation, and internships provided to local area youth in the Northwest Florida educational system.

Dr. Ford asked the Board members that anyone with a strong relationship with any member of the Triumph Board specifically, Don Gaetz, Allen Bense, Ben Lee, Jason Shoaf or Steve Riggs, a nice call this week as an IHMC Board member in support of this project is appreciated adding that Julie could provide the full proposal or a summary if desired. He concluded his remarks explaining that IHMC was excited about this opportunity as we had filed this proposal back in April of 2018 and that our understanding was that the staff review conducted was very favorable and we remain

hopeful the Triumph board will agree. He thanked the Board for their support commenting that this means a great deal to IHMC.

Dr. Ford then turned the discussion to the State Legislative Report and called upon Jeff Hartley and Matt Doster from our esteemed team in Tallahassee to provide the Board with an update on Tallahassee matters.

Jeff and Matt greeted the Board and updated everyone on the climate in Tallahassee explaining that everyone has started transitions following the very close election campaigns. They noted that there will be many positions to be filled over the next few months leaving Tallahassee very much in a status quo for the next several months. Jeff and Matt discussed key leadership positions and that the focus this year was to restore IHMC to its recurring high mark funding of \$4.7 million prior to cuts over the last few years. Dr. Ford thanked Matt and Jeff for their continued excellent work representing IHMC in Tallahassee.

Dr. Ford then turned his comments to new hires announcing that Dr. Tim Broderick has agreed to join the team as IHMC Chief Scientific Officer and Senior Research Scientist. He added that Tim is currently the Associate Dean for Research Affairs at Wright State University and Chief Scientist at Wright State Research Institute and his prior experience includes serving as Project Manager at DARPA, Professor of Surgery and Biomedical Engineering at the University of Cincinnati and as Senior Scientist and Trauma Portfolio Manager at the US Army Medical Research and Materiel Command. Dr. Ford noted that Tim received his MD from the University of Cincinnati and his BS in Chemistry and Computer Science from Xavier University adding that Tim is an innovative leader with proven strengths in perceptive problem solving and aggressively developing high impact biomedical technologies that enhance human health and create value for collaborating partners. He explained that Tim will join the IHMC leadership team and that we expect he will be instrumental in helping establish numerous new funding/research opportunities in the human performance and enhancement research space and will be of great assistance in Washington in introducing new research programs into agency budgets.

Dr. Ford then announced that Todd Norrell will be joining the IHMC Team as Program Director, Human Performance and Resilience. He mentioned that Todd is currently R&D Division Director at the Wright State Research Institute where he is responsible for the strategic vision and growth of the R&D Division; this division accounts for over 90% WSRI's \$30M projected revenue in 2018 and approximately 40 scientists and engineers. He explained that Todd has experience with the oversight, staffing and execution of 30 to 40 contracts annually and he provides direct support as a program manager for multiple DARPA contracts, tracking technical and fiscal requirements. He noted that Todd has a BS from Virginia Tech in Aerospace and Ocean Engineering and he holds a top-secret security clearance. Dr. Ford informed the Board that as they may have guessed, recruiting Tim was key in also attracting Todd and we are very excited to welcome both Tim and Todd to the IHMC team and he hoped everyone would be able to meet them in person early in the new year as both Tim and Todd should be joining IHMC on or about January 1, 2019.

Dr. Ford then turned to the research report announcing that IHMC has received \$5.3 million in new funding since the September meeting and that there is an additional \$11 million in contracting waiting on 2019 money to arrive at the agencies. He added that of course, we expect a reduction in the \$11 million as we move through the contracting process and that this funding could also be impacted by a government shutdown which would not be good for IHMC.

Dr. Ford then addressed several new awards commenting that Scientist David Fries begun working with Florida Fish and Wildlife Research Institute to evaluate Long-term Coral Outplants on a Large-Scale. He explained that this project will assess the effectiveness of dominant coral restoration technique on reefs and the results will provide a long-term monitoring method for out planted staghorn coral and help formulate an "Optimal Outplant Design" where outplants have the greatest survival opportunities.

He referenced that Dr. Kristy Hollingshead has been awarded a phase II SBIR for a Runnable Environment for Plug and Scrape Technology (REPAST) explaining that Kristy has experience in Natural Language Processing and Social Network Analysis and will develop the REPAST analytic capabilities needed to create a composite picture from multiple social media sources and provide informative visualization capabilities for both data and analytics. He added that in addition, social network analytics and community structure analysis tools will be developed to provide understandable insights directly to the end user in an intuitive way.

Dr. Ford mentioned that Dr. James Allen has received \$3.1M in DARPA funding to continue his work on Complex World Modeling and that James' team will continue to improve and refine the general framework for describing the I/O capabilities of external reasoning engines so that they can be chained together. He commented that this work also consists of developing a more robust collaborative problem-solving agent to work with a user to analyze situations using quantitative simulations as well as demonstrating improved identification and extraction of key data from machine reading.

Dr. Ford also referenced Research Scientist, Adam Dalton, who has received \$1.6 million from DARPA to collaborate with SUNY, Albany to design, develop, and evaluate Personalized Autonomous Agents Countering Social Engineering Attacks (PANACEA) to protect online users against all forms of social engineering. He explained that PANACEA will serve as an invisible intermediary between potential attackers (human, automated, hybrid) and the intended victims.

He also mentioned that Joe Gomes has been awarded a contract supporting US SOCOM and that this support primarily entails developing innovative and world leading high performance concepts and countermeasures to enhance and extend human potential in national level assets. He added that this work includes, but is not limited to, actionable and individualized solutions for performance baselines and continued motoring of health & performance biomarkers; nutritional and micronutrient enhancement; physical preparation & orthopedic reconditioning; neurocognitive & visual enhancement; regenerative & restorative performance strategies; education and portable solutions for

remote & secure access to high performance programs and expertise. Dr. Ford also commented that Joe also has been awarded another highly interesting contract, but it is embargoed from any discussions.

Continuing his report, Dr. Ford informed the Board that beginning in 2019, the human performance group consisting of Kernagis, Broderick, Gomes, Ford, Clark, and Norrell will begin a \$1.1 million SOCOM-funded study with the SALK Institute for Biological Studies. He explained that the objective of the proposed project is to evaluate the effect of an exercise mimetic, which is a molecule that induces molecular and cellular effect similar to those seen in response to exercise, on human physical and cognitive performance and resilience. He stated that Broderick and Kernagis will work with Salk researchers who have been leading the preclinical assessments and mimetic pharmaceutical development to ensure appropriate transition to human performance testing at IHMC.

Dr. Ford commented that IHMC is still awaiting execution of funds for Dr. Griffin and a number of other IHMC team members who were notified of a \$3 million award from ONR to research, develop, and demonstrate high speed humanoid robot behaviors for tactical urban operations alongside soldiers as a robot squad member. He explained that we now anticipate this will occur in January and that equipped with the right skills, humanoid robots promise to enable revolutionary changes in urban tactics across the full spectrum of squad operations, as well as transform disaster response, functioning as human avatars while keeping personnel safe. He mentioned that this team will design an autonomous behavior framework, combining skills into action tasks, or “behaviors” include identifying and opening doors, entering rooms, navigating through cluttered rooms, moving obstacles, going up stairs, and searching rooms.

Dr. Ford then turned to pending awards discussing two awards for Dr. Dawn Kernagis, one funded by US SOCOM focused on evaluation of the Apollo Neuroscience prototype and the other is funded by the Office of Naval Research and is a Ketone study. He explained that in her work with Apollo Neuroscience, Dr. Kernagis will be conducting independent human testing to evaluate the effects of their prototype wrist worn device. He commented that Dr. Kernagis’ work on the new ONR funded study will attempt to address performance issues facing warfighters in extreme environments using exogenous ketones to induce ketosis and provide fuel for the soldiers physical and mental performance. He explained that during high-intensity operations, a gap has been identified in providing soldiers the ability to sustain the high level of physical and cognitive output necessary to complete long duration mission sets. He added that in addition to the physical performance benefits of ketosis that have been demonstrated in numerous studies, research has shown that elevated ketone levels improve spatial memory impairment caused by hypobaric hypoxia, in addition to conferring neuroprotective effects in a variety of conditions, including CNS oxygen toxicity.

Dr. Ford then mentioned that Dr. Peter Neuhaus has a pending research agreement with ONR to develop High Performance Humanoid Robot for Urban Operations adding that this \$4.4M effort will entail research, develop, and demonstration of SquadBot, a

humanoid robot with the mobility to function in urban environments alongside soldiers as a robotic squad member. He commented that humanoid robots like SquadBot promise to enable revolutionary changes in urban tactics across the full spectrum of squad operations, including neighborhood watch, building search, patrol, street combat, building clearing and IED detection and defeat. He continued by stating that beyond urban combat, they also have the potential to transform emergency response, functioning as human avatars for first responders, providing situational awareness while keeping emergency personnel safe.

Dr. Ford stated that IHMC Research Scientist Dr. Parisa Kordjamshidi has received notification of selection on her \$2 million proposal submitted to the Office of Naval Research explaining that this project is focused on developing a framework and a novel underlying formalism for integrating domain knowledge and statistical learning. He added that the objective is to find a breakthrough abstraction for designing complex AI systems based on data and knowledge representation rather than based on underlying computational units.

Turning to technology transfer initiatives, Dr. Ford commented that IHMC continues its successful relationship with Cobalt Intelligence. He explained that Dr. Peter Neuhaus and his team are leveraging the recent delivery of NASA's lightweight and compact prototype robot-based exercise device to wrap up the first iteration of the commercial facing version being developed in collaboration with Cobalt Intelligence. He added that this version, currently known as "Galaxy," will initially target professional sports enterprises and elite warfighters with an eventual target of both commercial and in-home gyms. He mentioned that in addition, Cobalt Intelligence is in discussions with IHMC's Dr. Alberto Cañas and is excited to explore the ever-growing opportunities that surround the CMAP tools.

Dr. Ford also discussed that IHMC has been contacted by a group Apollidon Learning in a potential partnership with the University of Florida to develop on line courses to support graduate and certificate programs, especially in the area of artificial intelligence. He explained that if these discussions continue and materialize into a project, Apollidan Learning would market these online programs. He added that this presents the opportunity for IHMC researchers to generate revenue streams via the development of the curriculum, delivery of the coursework, as well as through revenue sharing models with the universities delivering the programs. He concluded his comments on this by stating that we are also exploring the idea of a Cmap course perhaps leading to certification.

Dr. Ford then turned to Outreach and Education discussing that the Fall evening lectures are winding down with our very own Board Chair Dr. Bill Dalton in Ocala on Tuesday, December 4th discussing "Moving from Reactive to Proactive Medicine through Data Science" and with Dr. Dawn Kernagis on Thursday, December 6th in Pensacola, discussing "Living and Working in Extreme Environments". He added that he was hopeful Board members could attend one or both of these events adding that one can also view them once they are released on YouTube. Dr. Ford briefly commented on the Spring

lectures and encouraged Board members to let him know if they were interested in attending and joining the dinner following each lecture.

Dr. Ford then turned the discussion to the Fall 2018 Season of Science Saturdays commenting that this season is wrapping up in both Ocala and Pensacola and has been going well. He explained that this year, several topics at each location were organized by age, with grades 3 and 4 attending at 9 a.m. and grades 5 and 6 attending at 11a.m. He mentioned that this seems to be a preferred set-up, especially for 5th graders, who are able to appreciate more advanced activities and explanations than the younger students. He commented that the Spring 2019 Season will be similarly organized with several new topics are being developed, including Big Data in Ocala and Smart Sensors / Smart Cities in Pensacola.

He continued with outreach stating that last summer's robotics camp sponsorships totaled \$10,000 at both locations, adding that in Ocala, we received \$3,000 from Career Source and \$1,700 from Renasant Bank for both locations, and a few small sponsorships for individual scholarships and the Boys and Girls Club camp received sponsorships from Rich Bianculli (\$3,000) and Ron and Phyllis Ewers (\$1,500). He added that for Pensacola, the total was \$7,000 from Best Buy and \$3,000 from the Escambia County Sheriff's Office stating that Best Buy has also recently committed to \$7,000 for the 2019 camp in Pensacola. He explained that Ocala Science Saturday sponsorships since August 1st include \$2,500 from Publix, \$6,500 from the Colen Foundation, and \$3,000 from United Way via the Ewers and that in Pensacola, Science Saturdays received \$9,000 from the sheriff's department and for \$1,000 from a new sponsor, International Paper. He explained that Gulf Power also appears on the fliers as a sponsor as part of their donation some years ago.

Dr. Ford also mentioned that teacher training for after school robotics in Marion County was funded with \$10,000 from the Public Education Foundation of Marion County and \$9,400 from Rich Bianculli. He continued on stating that the teacher training program was conceived in 2017 to achieve greater reach than our on-site summer robotics camps with the thought on the part of the sponsors was that by helping to bring robotics to lower achieving schools, we might make a big difference, getting students who wouldn't otherwise have this opportunity excited about STEM through robotics. He added that these teacher training and outreach enjoy strong support in the schools and are beginning to show very positive outcomes.

Dr. Ford also updated the Board on STEM-Talk, the IHMC podcast, discussing that this continues to be a remarkably successful outreach effort with more than \$1.5M listeners thus far and that we will be releasing episode 78 shortly, where our guest is non-other than IHMC's own Jeff Phillips.

Dr. Ford briefly gave an update on the new roof in Ocala mentioning that it was now complete and looks terrific. He stressed the generous enabling gift of Ron and Phyllis Ewers that made it possible.

Dr. Ford concluded his report by inviting everyone to the December 6th Holiday Gala in Ocala explaining that this year it is a speakeasy theme and it promises to be lots of fun. He added that the Pensacola holiday party is December 20th and features food from around the world stating that he hopes everyone will join us at one or both of these celebrations. He thanked the Board on behalf of all of IHMC, for their service, support and friendship and wished all a wonderful holiday season and a happy new year.

Turning to Chair Dalton, Dr. Ford concluded his report. Chair Dalton thanked Dr. Ford for his excellent report and asked the Board if anyone had additional comments or questions. Hearing none, Chair Dalton informed the Board that the next meeting is a teleconference scheduled for Monday, March 4, 2019 at 8:30 am CT. He then adjourned the meeting at 9:45 a.m. CT wishing all a happy holiday season!

Respectfully submitted

Julie Sheppard
Corporate Secretary