IHMC Board of Directors Meeting Minutes
Monday, June 10, 2019
8:30 a.m. CST/9:30 a.m. EST Meeting

Roll Call	Chair Bill Dalton
Chair's Greetings	Chair Bill Dalton
Action Items	
1. Approval of March 4, 2019 minutes	Chair Bill Dalton
2. Discussion on IHMC Financials	Director Dick Baker
3. Discussion and Action on 2019-20 Meeting Dates	Chair Bill Dalton
Chief Executive Officer's Report	
1. Research Update	Dr. Ken Ford
2. State and Federal Legislative Update	Dr. Ken Ford
3. Technology Transfer Update	Dr. Ken Ford
4. Research Presentation	Dr. Ken Ford
Adjournment	
Lunch	

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, 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. He thanked UWF and Dr. Saunders for sharing their wonderful space with the IHMC Board the prior evening and to Chef Blake and IHMC for a delightful dinner.

He added that he would be remiss in not mentioning that this meeting today marks the 15-year anniversary of IHMC's first Board meeting and that he was aware that several around this table are inaugural board members including Carol Carlan, Jim Reeves, Eric Nickelsen, Eugene Franklin, and Hal Hudson. Ray Russenburger who could not be with us today is also an inaugural Board member. Chair Dalton thanked all the inaugural Board members for their 15 years of service to IHMC. Dr. Ford echoed that thanks to all the Board members and every board member received a special travel bag with the IHMC logo to thank them for their service.

Chair Dalton thanked IHMC for the gift and moved directly into the meeting, commenting that there were 3 items to discuss this morning followed by Dr. Ford's report.

Turning to Action Item 1, Chair Dalton asked for a motion to approve the March 4, 2019 Minutes. Director Reeves moved approval which was seconded by Director Baker. With no changes, the March 4, 2019 minutes were unanimously approved.

Chair Dalton then moved to Agenda Item 2 asking Dick Baker, IHMC Chair of Finance and Audit to update the Board on the current financials. Director Baker discussed the financials in detail and

concluded by informing the Board that the net assets were increasing. Chair Dalton commented how exceptional this was remarking that the universities were not faring as well in the current climate.

Finally, Chair Dalton introduced Agenda Item, number 3, asking for discussion and approval of the proposed Meeting Schedule for 2019 2020 to include 4 scheduled meetings to be held as follows:

A Teleconference 8:30 a.m. CST: Friday, October 4, 2019
A Teleconference 8:30 a.m. CST: Monday December 9, 2019
A Teleconference 8:30 a.m. CST: Monday, March 16, 2020 and
An in-Person Meeting: Sunday/Monday, June 14th-15th, 2020 in Pensacola

Director O'Sullivan moved the proposed schedule of meetings and Director Nickelsen seconded. Hearing no objections, the proposed schedule passed unanimously. Chair Dalton commented that this action concluded the three Board items and turned to Dr. Ford asking him to provide his report. Dr. Ford thanked Chair Dalton for the opportunity to provide his report and said good morning to the Board and thanked them all for attending last night's dinner and today's meeting. He began his remarks by talking about the federal legislative outlook explaining that despite the challenging and uncertain legislative environment in Washington, IHMC continues to propose on new projects and look for additional opportunities at both the federal and private level. He added that the federal R&D budgets looks largely unchanged for the coming year but added that there is an increased emphasis in areas of importance and interest to IHMC such as AI, robotics, and human performance and resilience.

He then turned to the state legislative update explaining that IHMC is in the State budget for $2.7 mil recurring with an additional $1 million in nonrecurring revenue. He added that the Governor has 15 days to veto items and sign the budget after receipt and that as of today, the state budget has not been officially sent from the legislature so this clock has not yet begun to run. Dr. Ford explained that IHMC expects this will happen this week now that Governor DeSantis has returned from his trade mission to Israel. He continued his comments by asking all of the Board members to please thank the local Pensacola and Ocala delegation when you next see them for their efforts to assist IHMC this session commenting that IHMC continues to be grateful for their support.

Dr. Ford continued his report by announcing several new IHMC Team Members first mentioning that IHMC is proud to welcome Andrew Koutnik to the team explaining that Andrew will begin with IHMC's human performance team in September. He informed the Board that Andrew Koutnik is a researcher studying the influence of nutrition and metabolism on health, disease, and performance at University of South Florida (USF) Morsani College of Medicine adding that he originally began his research career at Florida State University (FSU) across the cardiovascular, cognitive cardiology, and cardiac muscle labs studying the influence of nutrition, exercise, supplementation, and environmental extremes on both the cardiovascular and autonomic systems in normal and clinical populations. Dr. Ford added that upon completion of his degree from FSU, Andrew was awarded the Presidential Fellowship from USF and invited to join the Metabolic Therapeutics Lab at the USF Morsani College of Medicine with a focus on studying metabolism and metabolic therapies for health, disease, and performance outcomes. He concluded by stating

that Andrew has had many offers to work at other research labs and universities but he has chosen IHMC and we are very happy to have him.

Dr. Ford next mentioned that Brandon Peterson has joined the team adding that Brandon received a B.S. in Computer Engineering and a B.A. in Mathematics from the University of Florida and that he just completed a Master's in Robotics from the University of Michigan, during which he worked with Elliott Rouse in the Neurobionics Lab. He explained that Brandon's work focused on the control of a testbench for validating optimal stiffness values of series elastic actuators used in wearable robotics and commenting that Brandon interned with IHMC last year. He stated that Brandon has just started as a Research Associate and will be continuing his work in software and controls with Peter Neuhaus and the exoskeleton team.

Dr. Ford also mentioned that John Lewis has joined IHMC explaining that John has been interning with us for the past year and is stellar. He informed the Board that we are in the process of converting his status to a full time Research Associate working with Dr. Dawn Kernagis and her team where he will play a solid role on the upcoming Salk award and the Phase 2 HVMN effort. He explained that John received a BS in Exercise Science from UWF this past May.

Dr. Ford also mentioned that Margaret Freyaldenhoven has also joined IHMC as a full time employee stating that Margaret has been working with Dawn Kernagis and Anil Raj as a research intern for some time and that we are pleased to also be transitioning Margaret to a full time Research Associate role working with Dawn on her Phase 2 STTR effort with HVMN and Anil on several new research projects he has starting. He commented that Margaret received her BS in Mathematics from UWF in 2017 and has been interning with Anil and Dawn since June of 2017.
Dr. Ford shared another exciting piece of news stating that Brendan Egan, a scientist from Dublin will be joining us in mid-June and adding that Brendan holds a position as Associate Professor of Sport and Exercise Physiology in the School of Health and Human Performance at Dublin City University. He explained that Brendan's current research investigates the molecular regulation of skeletal muscle function and adaptation across the life course, with special interest in the synergy between nutrition and exercise interventions to optimize performance in athletes and elderly. He stated that Brendan received his PhD from Dublin City University in 2008 and then completed two years of post-doctoral training at the Karolinska Institute in Sweden and that on the sporting front, he has played inter-county Gaelic football with Sligo since 2003, and consults as a performance nutritionist to elite team sport athletes. Dr. Ford added that he hopes everyone will get a chance to meet Brendan and his family while they are here this summer commenting that Brendan will return to the Pensacola in January 2020 and will work during his year-long sabbatical helping Cobalt Intelligence with technology transfer in the exercise space. Dr. Ford stated that the Cobalt work is funded by a grant from the SFI Industry Fellowship program and that IHMC is delighted that this has been approved for funding.

Dr. Ford also explained that it is that time of year again when we start welcoming summer interns and we will have our usual substantial collection of summer interns this year.

Dr. Ford then turned the discussion to his research report explaining that since our last Board meeting in March, IHMC researchers have received a lot of good news and have been awarded ten new projects for a total of approximately $8.3M in funding with another $20M in negotiation. He

began to discuss a select few of these projects explaining that Dr. Matt Johnson has been awarded a contract with NASA's Translational Research for Space Health program to augment automated measurement research with an effort targeting intelligent assistance of the user collecting lymphatic function data. Specifically, he stated, the research aims to use machine learning techniques to provide the user feedback about the usefulness and quality of the data being collected in terms of accurately measuring lymphatic function in order to improve lymphatic function measurement. Dr. Ford explained that this will ensure that the data collected is useful for generating accurate automatic assessments and that in addition, this approach should provide feedback about sensor physical positioning to improve data collection.

Dr. Ford mentioned that Dr. Kernagis has also been awarded Phase II of her project funded by SOCOM and in collaboration with HVMN who markets a ketone ester product. He commented that this research is intended to study Ketone esters for optimization of operator performance in hypoxia commenting that in a previously awarded SOCOM STTR Phase I contract Dr. Kernagis and her team demonstrated that the ketone ester-induced ketosis mitigated the hypoxia-induced decline in cognitive performance in a code substitution task. He explained that the newly awarded phase II research will further investigate the potential of ketone ester technology to augment operator cognitive and physical performance and resilience in mission relevant context mentioning that Dawn's part of this Phase II award is approximately $2 million over a three-year period.

Continuing with Dr. Kernagis, Dr, Ford stated that Dawn has been awarded a contract collaborating with the SALK Institute working on the development of MTB-1 as a novel performance enhancer adding that this is a very exciting and interesting effort with the objective of evaluating the potential of MTB-1 in enhancing endurance performance and cognitive function in individuals from the Special Operation Forces. He stated that the individual aims include testing the safety, efficacy, and optimal dosing of the drug alone, and in combinations with various exercise-training modalities, in improving performance and the specific goals of this project include (i) enhancing endurance capacity and performance; (ii) improving metabolic efficiency; and (iii) enhancing cognitive function.

Dr. Ford then discussed another Salk Collaboration, stating that Tim Broderick and his team have received an award of just over $1M providing research for epigenetic characterization and observation (ECHO) for DARPA. He commented that the research program with the clever acronym SAFE (Single-Cell Analysis for Forensic Epigenetics) will look to define changes in the features of an individual's epigenome to determine their history of exposure to Chemical, Biological, Radiological, Nuclear, and Explosive weapons of mass destruction and their precursors. He stated that the program will build a field-deployable platform capable of using the epigenome to assess CBRNE threat exposures, and support military forensics operations to counter-WMD proliferation.

Dr. Ford remarked that Todd Norell has been awarded a contract with WSRI to support the Tech Warrior Enterprise explaining that Tech Warrior addresses problems that persist in the development, implementation and transition of military technologies: 1) scientist and developers lacking an understanding of the warfighters' operational environment, and 2) operators not being able to evaluate technologies early enough in the R&D process to improve the chances of successful transition of the technology. He explained that these problems are addressed by

providing small businesses access to military and civilian operators while they train within an operationally relevant environment known as Calamityville.

Finally, Dr. Ford informed the Board that Dr. Anil Raj has been awarded work on Phase II of an STTR focused on researching a Closed-Loop Feedback Control for Transcranial Direct Current Stimulation (tDCS). He explained that the overall goal of this project is to build and validate the output of the research associated with Phase I of this STTR which includes a closed-loop tDCS system for cognitive enhancement in the workplace adding that a closed-loop approach enables targeted stimulation of appropriate brain areas at specific times in order to optimally mitigate cognitive fatigue or increase cognitive capacity. He further explained that to achieve this goal, the Phase II objectives focus on development of an integrated wearable prototype system, and validation of its ability to monitor and modulate cognitive state.

Dr. Ford then informed the Board that he was very excited to share news of a pending IHMC award from DARPA which has announced that our proposal led by Tim Broderick has been selected for funding adding that this will be one of the first efforts where IHMC will be the prime contractor on a very large multi-institution DARPA project. He explained that the proposed amount exceeded $50M and we are now engaged in contract negotiations with DARPA and our other institutional teammates.

He also announced another pending award in which Dr. Kernagis will receive funding from ONR for a study which will attempt to address performance issues facing US Soldiers in extreme conditions using exogenous ketones to induce ketosis and provide fuel for the soldiers physical and mental performance. He stated 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 explained that in addition to the physical performance benefits of ketosis that have been demonstrated in numerous studies, research has shown that ketosis improves 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 several upcoming summer Blue Sky meetings including one on June 25th and 26th where he and Dave Blakely will be hosting a meeting for Airbus and the objective is to create a set of "stories from the future" to inspire innovative concepts for airline cabins in the next 10 to 20-year timeframe. He commented that a second Blue Sky this summer, called the "Sustainment Innovation Summit," will take place July 31st and August 1st for the Air Force Research Lab and a third Blue Sky in Pensacola this summer will be held August 7th on CBD therapeutics.

Dr. Ford also updated the Board on the IHMC/UWF PhD program explaining that we have recently completed a Director Search for the joint PhD Program with UWF and that both IHMC and UWF are currently in negotiations with an individual to lead the program. He noted that this individual was ranked the number one candidate by the search committee upon reviewing applications and we are both hoping that she agrees to accept the position reminding the Board that this will be a 50-50 split appointment between IHMC and UWF and the beginning of an exciting venture. Dr. Ford also stated that he was also pleased to announce that the PhD program has accepted the first

student to start in fall of 2019 informing the Board that this student is an Air Force officer who will be working under PhD advisor Dr. Niranjan Suri.

Turning to outreach efforts, Dr. Ford stated that since we last met in March, IHMC has been quite busy with several lectures in both locations and many new ones on the horizon and that Science Saturdays continues with great success at both locations. He began by stating that IHMC has had some amazing evening lectures this year already … and as always … they were very well attended. He commented that in March, Pensacola hosted Andrew Taggart who provided a history of how certain historical forces and intellectual movements got bound together in Total Work to make us who we are today. He explained that Andrew is a practical philosopher who addressed the question of How did work go from being the worst fate imaginable (as opposed to philosophy and deep thinking) to being at once the keystone of modern life and the moral center of almost every modern person's earthly aspirations? He added that in April, the IHMC Pensacola office, in collaboration with the University of West Florida, hosted Dr. Jeffrey Moore who provided a very interesting lecture taking a forward-looking approach at new ideas in manufacturing through the lens of chemistry. Dr. Ford continued by mentioning that in March in the IHMC Ocala office and in April in the IHMC Pensacola office, IHMC hosted our own Joe Gomes (High Performance Director) who shared insights on lessons learned from serving elite populations like special forces operators and professional athletes. He added that in particular, Joe discussed evaluation & education, identification of key performance indicators, training & recovery strategies and injury & illness mitigation strategies and that Joe provided significant, actionable "low hanging fruit" that can help people of all ages and walks of life improve their physical and cognitive performance. Continuing on, Dr. Ford stated that in May, Pensacola hosted Todd White who provided a wide-ranging educational discussion on healthy wines and the moderation of alcohol for brain health, longevity, and vitality. In April, Ocala hosted Dr. Duane Mitchell who presented the concept of using a patient's own immune system to eradicate invasive cancers which has been under investigation for many decades, but recent breakthroughs in the field of cancer immunotherapy have revolutionized the landscape of treatments for many aggressive cancers such as metastatic melanoma, lung cancer, and kidney cancer. He commented that this talk reviewed the major approaches being deployed in cancer immunotherapy treatments and the relevance in the treatment of malignant brain tumors. Continuing on, Dr. Ford explained that in May, Ocala hosted Gideon Mailer who discussed Nutrition, Immunity, and the warning from Early America and that Gideon incorporated the latest work in the science of nutrition, immunity, and evolutionary genetics with solid scholarship on the history of indigenous North America.

Dr. Ford mentioned that this Fall we will also have some exciting Evening lectures and that to kick of the Fall season in September in Pensacola we will be Dr. Francesca Rossi to discuss her research in Artificial Intelligence. He explained that Dr. Rossi is an Italian computer scientist, now at IBM Watson Research and was until last year also a fulltime professor at the University of Padova and the president of the International Joint Conference on Artificial Intelligence and is Associate Editor in Chief of the Journal of Artificial Intelligence Research. He commented that this will be a joint talk with UWF to celebrate the start of the new PhD program and that the rest of the Fall speakers are equally stellar in both locations. He ended the evening lecture discussion by telling the Directors that he was hopeful they could join IHMC this fall for one or more of these talks.

In Pensacola this summer, he mentioned that we just held our first week of summer robotics camp for Rising 7th and 8th graders with 20 campers, 12 male and 8 female and about one half with financial assistance or fee waivers. He reminded the Board that IHMC charges a small fee for this camp to buy the Lego kits and pay Heath Parr the instructor for the past 4 years who is a teacher and Robotics Club instructor at Brown Barge Middle School. He explained that in this camp, 4 students were recommended by Workman Middle School, and 2 are former Science Saturday kids. He mentioned that Week 2 of the camp in Pensacola will be June 17th to the 20th and includes rising 8th and 9th graders. He stated that this camp will have 18 campers, with 13 male and 5 female and that 9 of the students will have full financial assistance in this group. He added that 1 student was recommended by Workman Middle School, 1 recommended by Dixon School for the Arts, 3 by the Pace Center for Girls, and 2 students from Boys and Girls Club.

Dr. Ford also explained that IHMC also uses volunteer interns who help and these include 3 former campers. All in all, he added, it looks like a great camp and robotics camp sponsors include Best Buy contributing $8,000; Escambia County Sheriff's Office with $3,0000 and Camp fees of $3,600.

In Ocala, Dr. Ford stated that Robotics Camp will happen the weeks of July 8th – 11th and July 15th – 18th and that registration is still ongoing and Sponsors include: Career Source for $3,000; Renasant Bank with $2,000; Lockheed Martin at $2,000; Ocala Electric; and Rich Bianculli. He added that this year Dr. Gregory Cruz, from Vanguard HS, will return as the Instructor making this his seventh year and that our Ocala high school volunteer interns include one former camper Dr. Ford concluded his remarks by stating that he speaks for all of the employees at IHMC when he says that we truly appreciate your time and commitment to the Institute. He then stated that this concludes my report Chair Dalton.

Chair Dalton thanked Dr. Ford for another excellent report.

He then asked the Board if there were any additional items for the Board and hearing none, he concluded the business portion of the meeting and thanked all the Directors who dialed in.

He explained that for those Directors here in person, we will be taking a short break and then returning to this room where Dr. Dawn Kernagis will be giving us an update on her new research projects. He stated that following Dawn's report we will be taking a group photo and visiting the robot lab to talk with Peter Neuhaus on his recent projects. After the robotics lab tour, he mentioned that everyone would come back upstairs and lunch would be served and that would conclude the June 10th meeting.

The full IHMC Board meeting adjourned at 11:40 am central time.

Respectfully submitted,

Julie Sheppard
Corporate Secretary