BIH Digital Health Accelerator Demo Day

November 26, 2019
Berlin

BIH Berlin Institute of Health
Charité & MDC

Welcome to BIH Digital Health Accelerator Demo Day 2019!

Tonight, seven innovation teams of researchers and clinicians of Charité – Universitätsmedizin Berlin and Max-Delbrück-Center for Molecular Medicine will demonstrate the digital health solutions they have prototyped over the past four months in the BIH Digital Health Accelerator program stage 1, supported by expert mentoring, funding, free co-working space at BIH, and access to our pool of talents and partners.

Innovation teams selected to advance to the BIH Digital Health Accelerator stage 2 will continue to receive end-to-end support to realize their visions of developing and translating digital health products into medical applications via industry cooperation, licensing, or spin-off company formation.

Each of these Charité and MDC innovation teams has been working extremely hard on top of their day jobs in clinic and research. To help their innovations become reality, partnerships are key. Whether you are a potential advisor or co-founder, validation partner or health insurance representative, industry partner or investor – innovation in medicine is a team effort. Together, let's collaborate to improve patients' lives.

The Berlin Institute of Health (BIH) is a biomedical research institution focused on precision medicine and translation. BIH is dedicated to improving the prediction of progressive diseases and developing advanced diagnostics and therapies that improve patients' health and quality of life. Charité – Universitätsmedizin Berlin and Max Delbrück Center for Molecular Medicine in the Helmholtz Association (MDC) are founding institutions and independent member entities of BIH. For the first time within the German science and healthcare system, basic research, patient-oriented clinical research, and clinical expertise are being brought together in a dedicated structure to foster biomedical discoveries and translational medicine.

BIH Innovations is the joint technology transfer office of BIH and Charité. BIH drives translational medicine by supporting the community of researchers and clinicians at BIH and Charité in discovering, developing, and commercializing assets such as new technologies and products via industry cooperation, licensing, and spin-off company formation. BIH Innovations also serves as a single point of access for partners to facilitate cooperations. BIH Innovations offers four service areas: Digital Labs with Digital Health Accelerator, Validation Fund/Spark-BIH, Patenting and Licensing, and Strategic Cooperations.

BIH Digital Health Accelerator (DHA) is operated by BIH Innovations Digital Labs. The DHA program supports innovators at BIH, Charité and MDC to conceptualize/prototype (stage 1) and develop/commercialize (stage 2) digital health solutions aiming at step-change improvements in patient outcomes and healthcare system performance. Initiated in 2017, 18 teams have participated in DHA stage 1 to date. Seven teams that started in 2017 or 2018 are currently targeting commercialization. With the initial set of spin-off formations expected for 2020, DHA is approaching proof of concept from concept to medical application. To fuel growth, DHA is open to partnerships with leading life science/technology companies and investors.

Notes

Agenda

5:45 – 6:30 **Registration**

6:30 – 6:40 **Welcome and Opening Remarks**

6:40 – 7:00 **Keynote**

Dr. Axel Heitmüller

Managing Director, Imperial College Health Partners

7:00 – 8:10 **Digital Health Accelerator: Pitch Session**

Hosted by Dr. Janna Hachmann

Business Development Manager, Captain T-Cell

AKICHECK – Clinical Decision Support System to Identify Acute Kidney Injury

Prof. Prof. h.c. Dr. med. Markus van der Giet

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Open.IU – A Diagnosis and Therapy Solution for Adolescents with Internet Gaming Disorder (IGD)

Dr. med. Olga Geisel

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ARCAS – AI For Life Sciences Best Treatment Possible for Every Cancer Patient

Dr. Altuna Akalin

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siloa – Solution for Digital Early Detection of Alzheimer's Disease

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3D Histopath – Bringing Histopathology from 2D to 3D

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SUMUS – A Trustable Physiotherapy Guide for Patients Affected by Muscle Diseases

Univ. Prof. Dr. med. Simone Spuler and Elisabetta Gazzerro, MD

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PREFREE – For Reducing Uncertainty in Pregnancy – A Decision Support Tool and Home Monitoring Solution

Prof. Dr. med. Stefan Verlohren

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8:10 – 8:15 **Closing Remarks**

8:15 – 11:00 **Networking Reception**

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AKICHECK

AKICHECK – Clinical Decision Support System to Identify Acute Kidney Injury

1.7 million deaths per year are caused by Acute Kidney Injury (AKI) globally. AKI is a frequent clinical event occurring in up to 20% of all hospital patients. It is characterized by a rapid deterioration of renal function to varying degrees, and associated with an up to 15-fold increased risk of mortality. In addition, patients with AKI have a significantly higher risk of developing or exacerbating a chronic kidney disease. The standard of care for AKI detection in clinical routine is based on a biomarker measurement and takes 48 to 72 hours to yield results, thus leading to delayed therapeutic intervention. As of today, an early detection tool for AKI is not available.

AKICHECK aims to close this gap of early detection with an easy-to-use tool for rapid and precise kidney function measurement. Translating scientific expertise in kidney function measurement to clinical routine, AKICHECK utilizes a proprietary database, a protocol for contrast agent measurement, and a software to diagnose AKI within the first two to seven hours – reducing the time needed over tenfold. AKICHECK is easy to integrate into today's clinical workflow everywhere and, given low component costs, promises a step-changing improvement in both patient outcomes and healthcare system performance.

Team AKICHECK unites deep expertise in clinical medicine with focus on nephrology, biomedical and laboratory expertise, biostatistics and machine learning. The team is working with advisors in the areas of software development, regulatory affairs, and market access.

KEYWORDS
Nephrology, Acute Kidney Injury, Laboratory Test, ICU

ASK
- Industry (medtech laboratory equipment) and laboratory services to explore co-development or licensing.
- Industry (pharmaceutical) to explore potential for licensing or further development of a companion diagnostic solution.
- Clinical Partners to further develop and test the solution in clinical trials.

Open.IU – A Diagnosis and Therapy Solution for Adolescents with Internet Gaming Disorder

In our digitalized world, a rising number of adolescents is being affected by internet gaming disorder (IGD). The WHO defines IDG as the inability to stop playing even though it interferes with other areas of a person's life, such as family relationships, school, work, and sleep. These problems would typically persist for at least one year. IGD is a distressing medical condition, which leads to daily life dysfunction, is associated with psychological and psychiatric issues, and thus needs qualified care.

Team Open.IU has developed an online solution to provide diagnosis and treatment of IGD and co-occurring psychiatric conditions to parties involved. Open.IU consists of two components: an online diagnostic test, and an online counseling and therapy tool. The diagnostic test is based on a scientifically proven, standardized test for targeted screening, an in-depth evaluation for IGD and potential co-morbidities. The counseling and therapy tool provides access to licensed therapists and to modules based on cognitive behavioral therapy. With Open.IU, seeking professional guidance and medical attention for internet gaming disorder will be accessible to everyone instantly and without waiting times. This solution is a low-threshold, easy-to-use service, and makes mental health care accessible for everyone at any time. In addition to patients, Open.IU also provides information and recommendations to caregivers, such as families of affected adolescents. The Open.IU solution can be extended in the future to also cover other mental health conditions such as ADHD, alcohol addiction, anxiety, or depression.

Open.IU consists of an interdisciplinary team of experts in psychiatric and psychosomatic diseases, diagnostics and therapy for children and adolescents from Charité – Universitätsmedizin Berlin and School of Medicine at Hofstra/ Northwell in New York. The team is supported by advisors for computer game development, user research as well as reimbursement.

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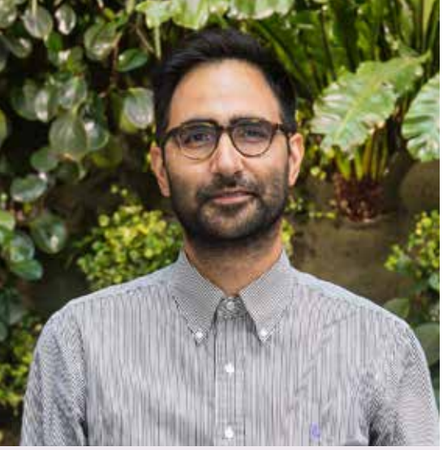
OPEN-IU

KEYWORDS
Mental Health, Internet Gaming Disorder, Addiction, Diagnosis, Therapy, Online Intervention

ASK
- Partnership with insurance companies for clinical trials.
- Partnerships with clinical institutions to test the solution.
- Partnerships with educational institutions for testing the solution.
- Partnerships with industry for co-development.



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arcas
AI FOR LIFE SCIENCES

ARCAS – AI for Life Sciences Best Treatment Possible for Every Cancer Patient

Cancer – a disease of the genome – is the second leading cause of death globally and is responsible for an estimated 9.6 million deaths in 2018. To make cancer treatments more effective it needs to be personalized from diagnosis to treatment. In today's clinical practice, however, the information from the genome is either not used or is used inefficiently.

Team Arcas is building an AI-based diagnostic decision support system for cancer. This system makes sense of complex genomic information to support personalized, precise diagnosis and therapy recommendations. At the core, the system analyzes complex genomic information: every cancer biopsy is sequenced not only for mutation detection, but also for large-scale alterations, gene expression, and epigenetic changes. Arcas is using a multi-level deep learning approach to integrate clinical, genomic, and pharmacological data. With this system, Arcas can predict patient cancer subtypes, survival outcomes, and personalized drug response, more precisely. Arcas has shown promising results for colon, breast, and lung cancer. With more data available, the system can be used for many more cancerous diseases.

The Arcas system also serves pharmaceutical R&D purposes, e.g., by identifying biomarkers to support the stratification of clinical trial participants, or by helping to interpret the molecular differences between responders and non-responders to a particular pharmaceutical product. Furthermore, Arcas aims to improve cancer diagnostics and clinical therapy decisions.

Team Arcas consists of international experts in the field of bioinformatics, omics data science, and medicine from the Institute for Medical Systems Biology at Max Delbrück Center for Molecular Medicine in the Helmholtz Association in Berlin. The team is supported by an advisor in life sciences and new venture development.

KEYWORDS
Oncology, Genomic Data, Artificial Intelligence and Machine Learning, Decision Support Tool

ASK
- Cooperation with clinicians to test software with real world evidence.
- Cooperation with pharmaceutical industry for co-development and testing.
- Cooperation with CROs to further develop and test the system in clinical trials.
- Cooperation with institutions to create additional use cases in oncology.

siloa – Solution for Digital Early Detection of Alzheimer's Disease

Worldwide, at least 50 million people are believed to be living with dementia; a number projected to reach 82 million in 2030 and 152 million in 2050. Dementia is a syndrome associated with deterioration of memory, thinking, behavior, and the ability to perform everyday activities. Dementia has a substantial physical, psychological, social, and economic impact, not only on people with dementia, but also on their caregivers, families, and society at large. Alzheimer's disease is the most common form of dementia. While no cure for Alzheimer's is known today, it is being feverishly worked on. Early detection and lifestyle interventions are believed to improve quality of life.

Team siloa is working on a digital test for the early detection of Alzheimer's disease to intervene in the disease progression. For the test, the team is developing a digital biomarker, combining software-based tests that engage brain areas known to be affected in very early stages of Alzheimer's disease. The test will be initiated by a physician and then conducted by the patients in the comfort of their homes for 15 minutes per day over the span of a month. An Alzheimer's probability score will then be transferred directly to the physician to maximize certainty for their patients and their caregivers. Siloa wants to enable a future where early detection of Alzheimer's disease facilitates the diagnostic process and ensures that everybody receives the care they need as early as possible.

Team siloa consists of clinicians and researchers in geriatric medicine at the Memory Clinic at Charité. The team is working with experts in user research, software development, and reimbursement.

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siloa
Detect Alzheimer's Disease

KEYWORDS
Alzheimer's Disease, Early Detection, Digital Test, Real-Time Monitoring

ASK
- Cooperation with clinical institutions and insurers for clinical studies.
- Cooperation with industry for co-development.

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3DHISTOPATH

KEYWORDS
Pathology, 3D Microscopy, Tissue Staining, AI-Software

ASK
- Cooperation with clinical institutions to deepen and broaden use cases.
- Partnerships with industry, e.g., microscope manufacturers, laboratory service providers, and pathology equipment manufacturers.
- Cooperation with pharmaceutical companies, e.g., for pharmaceutical development.

3D Histopath – Bringing Histopathology from 2D to 3D

No cancer diagnosis without histopathology. Histopathology refers to the preparation and examination of tissue samples in order to study symptoms of a disease. In clinical medicine, a biopsy or a surgical specimen is obtained, sliced, and transferred onto a glass slide, stained with a chemical agent and then examined under the microscope by a pathologist.

However, today's histopathology process is restrained by several limitations. Cutting samples into slices may miss relevant locations, distort and damage tissue, and thus often prevents secondary sample analyses, e.g., via genetic sequencing. Current staining agents only penetrate tissue samples relatively slowly. Information on 3D structures such as blood or lymphatic vessels cannot be seen entirely, and pathologists need to examine the sample via "eyeballing," a process requiring a very high level of specialization which is also exposed to inter-observer variability. In sum, 2D pathology is not fully adequate for handling the information of our 3D human body.

3D Histopath can address this need by developing an end-to-end histopathology pipeline for improved diagnoses and therapy decisions. The 3D Histopath solution consists of two core components: a staining solution and a software solution. The staining solution includes a new staining technology using Nanobodies able to penetrate large tissue samples much faster than traditional staining agents. The software component in development entails a visualization functionality for pathologists to see 3D structures such as vessels, and an indication-specific AI-based analysis functionality to highlight key sample areas, e.g., metastasizing regions. Initial use cases include lymphedema, lipoedema, and cancer. In the future, other use cases will be implemented. Based on these benefits, 3D Histopath aims to improve and speed up the clinical histopathology process for better diagnoses and therapy decisions. At the same time, 3D Histopath can be of relevance for pharmaceutical development.

3D Histopath is currently being developed by a medical doctor and researcher in human genetics at Charité and a lab technican. The team is supported by advisors in business matters, technology development, user research, and market access.

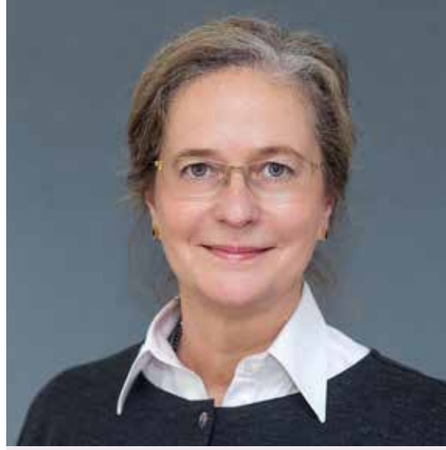
SUMUS – A Trustable Physiotherapy Guide for Patients Affected by Muscle Diseases

Muscular Dystrophy (MD) is a set of genetic conditions that gradually causes the weakening and breaking down of skeletal muscles, leading to an increasing level of disability. This progressive condition is often at first affecting a particular group of muscles and then deteriorates them over time. Some types of MD eventually affect heart muscles or breathing-related muscles, at which point the condition becomes life-threatening. MD is a rare disorder but also one of the most frequent genetic conditions affecting roughly 1 in 3,500 individuals worldwide. As of today, there is no cure for MD, but treatment including physiotherapy can help to manage the progression of symptoms.

Physiotherapy for patients with MD is fundamental, albeit needs to be highly personalized to ensure a sufficient level of muscle stimulation while not causing an overstimulation that could cause further damage of the muscles. In Germany and Europe, only a few physiotherapists are trained to provide this expert service. Worse, there is a significant barrier to accessing these professionals given the mobility constraints of many patients. In sum, patients affected by muscle dystrophy need personalized and engaging physiotherapy to maximize their quality of life and potentially decelerate the progressive condition.

Team SUMUS is developing a virtual physiotherapist tool to engage and correctly guide muscle patients to a well-balanced life with the right amount of training. The individualized training syllabus is devised by a physician and a physiotherapist in close coordination with the patient. Part of the solution is the SUMUS Smartwatch application that tracks any active movement of the patient's arms (initial prototype) in daily life and then advises the patient whether to train, which exercises to use, and to what extent. The physiotherapist and the physician can monitor progress continually via captured longitudinal data and adjust individual training plans with patient input as needed. This mutual feedback feeds into a self-learning algorithm to ensure continuous optimization of the patient's fatigue monitoring and training. In the future, SUMUS could be extended by further technologies to also cover additional body parts, e.g., sensor shirts, and additional digital physiotherapy applications. With an increase in use of the SUMUS application, real-world evidence will be generated to develop, validate, and monitor new therapies and hopefully lead to a cure for MD.

SUMUS combines interdisciplinary expertise in neurology, muscle dystrophy diagnosis and therapy research at Charité and MDC, physiotherapy, computer-aided medical robotics, and game-based learning. The team is working with advisors in user experience, hardware and software development and reimbursement.



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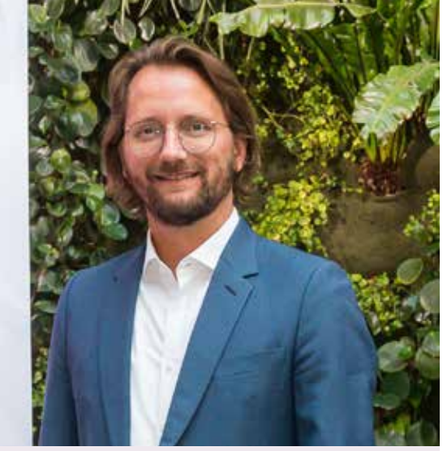
SUMUS

KEYWORDS
Muscular Dystrophy, Guided Physiotherapy, Digital Health Solution, Home Monitoring

ASK
- Health insurers to study benefits for insured patients and validation.
- Technology partners to co-develop additional SUMUS functionality.
- Clinical partners for further prototype testing and clinical trials.
- Industry partners to explore cooperations for clinical trials and therapy development.



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PREfree

KEYWORDS
Gynaecology/Obstetrics,
Preeclampsia, Digital Test, Remote
Monitoring Solution

ASK
- Cooperation with insurance companies for patient-centered care studies.
- Cooperation with clinical institutions for clinical validation.
- Partnership with pharma or technology industry for co-development.
- Software documentation companies for co-development.

PREFREE – For Reducing Uncertainty in Pregnancy – A Decision Support Tool and Home Monitoring Solution

Maternal mortality is unacceptably high. As a leading cause of maternal mortality, preeclampsia and related hypertensive disorders of pregnancy claim the lives of nearly 76,000 women and 500,000 babies worldwide every year. This life-threatening complication of pregnancy can be prevented by better diagnosis, treatment, and monitoring.

Prefree is an AI-based decision support tool for physicians to identify pregnant women at risk for pregnancy complications, especially preeclampsia. This patient-centered solution was developed based on a clinical outcome database and interviews with patients and physicians. The solution aims to support physicians to identify the individual risk for preeclampsia, to decide whether to hospitalize patients in need and to allow patients with low risk to return to their homes. The decision support solution will be complemented by a remote monitoring system that enables women returning home to closely monitor their signs and symptoms in a close contact with their physicians.

Prefree intends to reduce the risk of false diagnosis, to avoid unnecessary hospitalization, and to reduce healthcare costs by patient-centered remote care within the support system and convenience of their homes. In the future, the system can add new technologies for additional benefits, be scaled to other regions with even higher prevalence of preeclampsia, and be extended to other pregnancy complications. Team Prefree consists of a team of medical doctors of the Department of Obstetrics from Charité – Universitätsmedizin Berlin and a PhD student with machine learning and software development expertise. The team is supported by advisors in machine learning, patient-centric care, business matters and reimbursement.

Notes

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PLEASE WATCH OUT!

Our next BIH Digital Health Accelerator call will open in early Spring 2020.

For more information and updates please visit
www.bihealth.org/dhacall2020

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