The Center for Machine Learning and Health at Carnegie Mellon University (CMLH) is pleased to announce its Fall 2017 proposal solicitation for research projects.

Overview of the CMLH
The CMLH is one of two R&D centers launched under the umbrella of the Pittsburgh Health Data Alliance formed by UPMC, Carnegie Mellon and the University of Pittsburgh. The CMLH is a university-level center whose participation is open to the entire University.

The CMLH vision is to harness data and information from sources as varied as electronic medical records, genomic sequencing, and wearable sensors and more into new systems, products and services that will change the way diseases are prevented, patients are diagnosed, treated and engaged in their own care. The mission of the CMLH is to promote novel digital health technology that rethinks and reinvents paths to wellness, healthcare delivery, and healthcare infrastructure.

The CMLH seeks innovative, transformative research and development in all aspects of healthcare-related analytics, reasoning, and prediction with the goal of generating systems and tools for improving the quality, efficiency, and cost-effectiveness of healthcare.

Awards and Funding Scope
The CMLH structure provides for Early Stage Research Projects (ESRs), which are anticipated to have budgets of $200,000 to $400,000 (including university overhead) for a single year project duration. After one year, projects may attract more funding to refine the technology and/or its development for commercialization.

The CMLH and UPMC Enterprises will make final decisions as to the size of funding allocations. Once selected for an award, the CMLH and UPMC Enterprises will help identify potential clinical and data access partners.
Focus Areas

The Challenge: Unleash the power of technology to reinvent healthcare

The CMLH seeks innovative Projects and Research Plans that have high potential for impact and value that may be delivered to the variety of stakeholders in health and wellness:

- Patients (and their caregivers)
- Providers (physicians, other clinicians, nurses, administration, operations)
- Payers (insurers, government, employers, patients)
- Health Care Institutions (hospital systems, medical clinics, practices)

The CMLH is looking for great science that addresses one or more of three focus areas:

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<th>Improving Outcomes</th>
<th>Consumer-Oriented Healthcare</th>
<th>Infrastructure and Efficiencies</th>
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<td>Connect and coordinate the health system to empower clinicians to provide high quality care in any setting</td>
<td>Develop solutions that allow consumers to access medical services and information anytime, anywhere, and to engage in all steps of the health care journey</td>
<td>Enhance resource allocation, service levels and care pathways to coordinate and manage the cost of care</td>
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Projects should strive to bridge the gap between research and practice and present a line of sight to commercial application: demonstrate a pathway from the bench to the bedside.

The CMLH is technology agnostic: enabling technology from computer science, biology, engineering, policy, operations, design, behavioral/social sciences and the arts and more are all possible drivers or components of novel, interdisciplinary solutions in digital health care.

We are open to all ideas that faculty deem relevant from disciplines across the University.

The Focus Areas present a broad range of opportunities in the digital health space. The chart below presents just of few of the challenges/opportunities for advances in digital health to create substantial advances in health care. A broad variety of technologies and science from across CMU may be brought to bear as
key drivers or in combination: machine learning, artificial intelligence, natural language processing, innovative materials/sensing, robotics, design, novel statistical inference, behavioral economics, genomics, human computer interaction, operations management, biomechanics, biology and computation, privacy and security, policy, embedded systems, and more.

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<td>How do we capitalize on the exponential growth of omics data to enable the development of new therapies, enhance diagnosis, and proactively manage disease?</td>
<td>How do we leverage the growing infrastructure of the IoHT (health things) and the IoP (patients) to engage consumers in their wellness and therapy?</td>
<td>How do we capitalize on the shift from health care as a ‘product’ to healthcare as a service?</td>
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<td>How can we use new data, structured and unstructured, to create and enhance support tools for clinicians?</td>
<td>How can we make mobile/wearable/embedded computing more useful for consumers, enable integration of this data with clinical practice and other data, and in aggregate form proactively manage population health?</td>
<td>How can we envision and make concrete new models of capital and service design that capture both effectiveness and efficiency?</td>
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<td>How do we design tools and systems to enable individualized medicine while managing digital overload?</td>
<td>How do we enhance and create new value via ‘cybertherapy’ (telemedicine, monitoring etc.)?</td>
<td>How do we manage the financial, policy evolution, and societal risk of the evolving healthcare system and its underlying demographic challenges?</td>
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<td>How do we build new or enhanced systems to manage and protect EHR, genomic data, et al., as evidence-based approaches to care create a demand for health care data liberalization?</td>
<td>How can we use the digital space to create opportunities to enhance interaction and extend clinical impact?</td>
<td>How does the transition from consumer wearables to clinical-grade wearables generate data that can be used to enhance asset and service level optimization?</td>
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<td>How can we develop and marry ‘machine insight’ into human expert diagnostic and therapy protocols to reduce variation in therapy and outcomes?</td>
<td>How can intelligent systems modify/support behaviors that enable individualized medicine and improved outcomes?</td>
<td>How do we marry new data-driven insights into treatment pathways to eliminate waste, unnecessary tests, and inappropriate therapies?</td>
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Proposal Submission and Review

Proposals are welcomed from faculty in all units of the university. PIs are asked to submit an Intent to Propose (ITP): a one page summary of the proposed project by **September 18th, 2017**. The deadline for full proposals is **October 30th, 2017**. Please submit ITPs and Proposals to the CMLH at cmlh@cs.cmu.edu

A panel of reviewers consisting of CMU faculty and senior staff of the CMLH will review the ITPs and proposals. **Please use the ITP as a way to gather feedback ahead the completion of your proposal.** The CMLH will reach out to you with ideas as needed to suggest enhancements. Proposals will also be evaluated by staff at UPMC Enterprises. Final award decisions will be made collaboratively by the CMLH and UPMC Enterprises.

Proposals will be competitively reviewed based upon the following factors:

- Scientific, engineering merits and novelty/uniqueness of the proposed technology: advantage over competing or existing solutions
- Potential impact and value: enables improved outcomes, engages patients and enhances population management, drives data and evidence-based approaches to reduce variability while ensuring privacy and security, generates savings by reducing waste, inefficiencies, over-utilization of resources.
- Tangible deliverables (proof of concept such as pre-market prototypes, etc.) from the work that supports further fundable development: provides a basis for commercialization
- Potential for unencumbered intellectual property
- The robustness of the team assembled

**Obligations:**

All researchers, faculty and students participating in research projects funded through the CMLH must acknowledge and agree to the terms of the CMLH Agreement and the Alliance Agreement. Please contact the CMLH at cmlh@cs.cmu.edu with any questions regarding the agreements or for other questions about the CFP.