

## Latest Jump ARCHES Grants Focus on Health Equity & Early Intervention

### For Immediate Release

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(January 20, 2021/PEORIA, ILLINOIS)- Thirteen research projects are sharing nearly \$970,000 in funding through the [Jump ARCHES research and development program](#). The Jump Applied Research for Community Health through Engineering and Simulation (Jump ARCHES) program is a partnership between OSF HealthCare and the University of Illinois (U of I), Urbana-Champaign and its College of Medicine in Peoria.

The program supports research involving clinicians, engineers, and social scientists to develop technologies and devices that could revolutionize medical training and health care delivery.

These projects were submitted to the Fall 2020 Jump ARCHES request for proposals which concerned six unique focus areas: **digital health, social and behavioral disparities, autism, neurological sciences, COVID-19, and simulation and education**. This was the first Jump ARCHES request for proposals that specifically concerned social and behavioral disparities to mitigate the impact of age, location, and social barriers in delivering quality health care to vulnerable populations. Emphasis was given to proposals that addressed racism, social justice, social and implicit biases, health equity, and access to care.

“Our experience with the COVID-19 pandemic has taught us that safe and health-focused behavior has played such an important factor in mitigating the spread of the disease,” said John Vozenilek, M.D., F.A.C.E.P., V.P., and Chief Medical Officer of Jump Simulation Center in Peoria. Many of the projects represented here involve technology to improve earlier intervention which is key, particularly as we look to bring solutions for disparities in health outcomes for those who are at increased risk. It is clear there is a link between chronic health conditions and vulnerability to infectious diseases such as COVID-19. He added, “Our work is to improve prevention and early treatment for those disproportionately impacted.”

Since its inception in 2014, Jump ARCHES has awarded more than \$5.46 million in funding to collaborative projects between the three institutions and across many disciplines. The effort expanded opportunities with [an additional major gift in 2019](#).

“The scope of Jump ARCHES has expanded in recent years to foster collaboration with disciplines outside of engineering and medicine, such as social sciences,” said T. Kesh Kesavadas, Ph.D., director of the Health Care Engineering Systems Center at the University of Illinois Urbana-Champaign. Technology such as AI, sensors, and simulation training can integrate with and improve outcomes in other fields in innovative ways.” Kesavadas added, “Above all, Jump ARCHES is striving to improve people’s lives after the disastrous impact of COVID-19 on daily life.”

“The integration of engineering and social science promises to make the University of Illinois the world’s leading institution for innovative, technologically-driven research on social science topics, and puts social sciences in a position to advise and shape engineering efforts,” said Brent Roberts, Ph.D., director of the Center for Social and Behavioral Sciences at Illinois. He added, “The alignment of CSBS with the ARCHES program fits perfectly with a goal of our new center, to harness the technological innovations of engineering to make society better.”

A special request for proposals for spring 2021 is being planned with an emphasis on solutions to the unprecedented challenges faced by our society as we develop policies and procedures in a post-COVID-19 world.

[Here are summaries of some key projects with a full list of Fall 2020 projects available on the Jump ARCHES website.](#)

### Remote state anxiety detection and monitoring using multimodal wearable sensors

*Investigators: Manuel E. Hernandez, PhD, UIUC; Elizabeth Hsiao-Wecksler, PhD, UIUC; Richard Sowers, PhD, UIUC; Brent Roberts, PhD, UIUC; Susan Caldecott-Johnson, MD, UICOMP, OSF HealthCare Children’s Hospital of Illinois; Jean Clore, PhD, UICOMP*

In frontline health care workers, recent evidence suggests increased depression, anxiety, insomnia and distress due to the COVID-19 pandemic. Even without COVID-19, physician trainees face mental health challenges as they provide care and learn clinical best practices. This project will integrate data from a suite of wearable sensors to quantify symptoms of stress and anxiety in physician trainees. The idea is to use information gleaned from sensors to monitor and potentially improve wellbeing before mental health disorders develop.

### Spatio-temporal Analysis with Tensor Factorization and Visualization for Pediatric Mobile Vaccination

*Investigators: Jimeng Sun, PhD, UIUC; Mary Stapel, MD, OSF HealthCare; Scott Barrows, OSF HealthCare; Adam Cross, MD, OSF HealthCare; Elise Albers, OSF HealthCare; Ginger Barton, OSF HealthCare; Michelle Sheppard, OSF HealthCare; George Heintz, MSPH, MSE, UIUC; Yaroslav Daniel Bodnar, MD, OSF HealthCare, UICOMP*

This project proposes to use AI technology to understand and improve the pediatric population health challenge of timely vaccination. With the help of AI, the project will visualize spatio-temporal patterns, identify critical geographic areas with the most concerning rates of under-vaccination, predict the supply need and deploy mobile immunization units to increase vaccination rates for those areas. This will improve vaccination rates in high-risk zip codes, revealing barriers around access to care and other social determinant obstacles.

### **Toward Automated Diagnosis of Seizures and 3D Representation of SEEG Clinical Data**

*Investigators: Matthew Bramlet, MD, UICOMP, OSF HealthCare; Brad Sutton, PhD, UIUC; Yogatheesan Varatharajah, PhD, UIUC; Andres Maldonado, MD, UICOMP, OSF HealthCare; Michael Xu, MD, PhD, UICOMP, OSF HealthCare*

Some patients with seizures face debilitating effects that pharmacologic therapy cannot treat. These patients are left with surgery as their best option that requires an invasive procedure (stereotactic-electroencephalography or SEEG) to pinpoint the origin of these seizures. This project will present surgeons with a stereoscopic 3D model to give surgeons a better mental representation of where seizures are occurring. The group also wants to develop an automated interpretation algorithm of SEEG tracings, and create predictive algorithms to reduce invasive testing.

[See the complete list of the latest Jump ARCHES grant projects.](#)

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**OSF HealthCare** is an integrated health system owned and operated by [The Sisters of the Third Order of St. Francis](#), Peoria, Illinois. OSF HealthCare employs more than 23,600 Mission Partners in 147 locations, including 14 hospitals – 10 acute care, four critical access – with 2,097 licensed beds, and 2 colleges of nursing throughout Illinois and Michigan. The OSF HealthCare physician network employs more than 1,500 primary care, specialists and advanced practice providers, who are part of the [OSF Medical Group](#). OSF HealthCare, through [OSF Home Care Services](#), operates an extensive network of home health and hospice services. It also owns Pointcore Inc., comprised of health care-related businesses; [OSF HealthCare Foundation](#), the philanthropic arm for the organization; and [OSF Ventures](#), which provides investment capital for promising health care innovation startups.

**Jump Simulation**, a part of [OSF Innovation](#), is a collaboration between University of Illinois College of Medicine at Peoria and OSF HealthCare. The Jump center replicates a variety of patient care settings to ensure novice and seasoned clinicians can practice handling medical situations in a life-like environment. Boasting six floors and 168,000 square feet, the center is one of the largest of its kind and provides space for conferences, anatomic training, virtual reality and innovation. For more information, visit [www.jumpsimulation.org](http://www.jumpsimulation.org).

### **Partners in Jump ARCHES**

**University of Illinois College of Medicine Peoria (UICOMP)** educates 244 medical students and nearly 300 physician residents annually. The College of Medicine is home to the Cancer Research Center, the Center for Outcomes Research, and a collaborator in Jump Simulation. Learn more about UICOMP at <http://peoria.medicine.uic.edu>

**Health Care Engineering Systems Center (HCESC) of the U of I Grainger College of Engineering** provides clinical immersion and fosters collaboration between engineers and physicians. HCESC designs collaborative solutions to improve health care outcomes utilizing their expertise in simulation technologies, smart health systems, data analytics, human factors, and medical robotics. HCESC partners with Jump Simulation of OSF HealthCare at Peoria, Illinois, in this innovative relationship of Applied Research for Community Health through Engineering and Simulation (ARCHES). Learn more about HCESC at <https://healtheng.illinois.edu/>

**Illinois - Grainger College of Engineering:** As one of the world's top ranked engineering programs, their students, faculty, and alumni set the standard for excellence. The College is focused on driving the economy, reimagining engineering education, and bringing revolutionary ideas to the world. They work to solve the world's greatest challenges and look toward the future to find ways to make it a reality. Learn more about the College of Engineering at <https://engineering.illinois.edu/>

**The Center for Social and Behavioral Science (CSBS)** was created to help address some of the grand challenges facing society that can be answered using the deep social and behavioral science expertise housed at the University of Illinois at Urbana-Champaign. In particular, the CSBS will focus on three grand challenges 1) solving poverty, 2) understanding the effect of technology on society, and 3) the role of social and behavioral factors in health. More information can be found at <https://csbs.research.illinois.edu/>