University of Washington Health Sciences Library

Medical Libraries of the Future: a Medical Virtual Reality Studio in the Puget Sound Region

Overview

The University of Washington Health Sciences Library is applying for an IMLS National Leadership Grants for Libraries Sparks category in the amount of $24,994. Heart disease is the leading cause of death for people of most ethnicities in the United States. About 610,000 people die of heart disease in the United States every year[1]. Cardiology patient outcomes can be improved by access to virtual reality (VR) visualization technology and the fostering of team science. Librarians can work with healthcare professionals to provide access to both VR technology and traditional library services such as data and metadata management. This initiative aims to: 1) design and build a VR studio in a health sciences library, 2) hire a metadata librarian to build a VR heart library to improve diagnosis and treatment of patients in the Puget Sound region, and 3) position medical libraries and librarians for future roles. This initiative will bring together a team of physicians, nurses, librarians, and VR experts to visualize and better understand patient anatomy by creating immersive VR clinical experiences and an organized online VR library to address structural heart disease in advance of procedural intervention. This is the first project of its kind between cardiologists, radiologists, medical librarians, and industry.

Project Implementation Team

The project implementation team has national and regional expertise in innovative library service implementation, VR technology, and data visualization in the medical sciences. The UW Health Science Library has implemented data management services for medical researchers via the Translational Research and Information Lab initiative. The Institute of Translational Health Sciences is a recipient of the Clinical & Translational Science Award that promotes innovation in healthcare research to improve patient results. The Center for Multidimensional Medicine uses innovative approaches to clinical care to re-envision physician training and patient treatment. Oculus VR is a leading VR company working in the medical VR space. Pfeiffer Partners is a leading design firm working with academic and cultural libraries around the US to redesign and conceptualize libraries of the future.

Principle Investigators: Tania Bardyn, MLIS, AHIP Associate Dean, UW Libraries and Associate Affiliate Professor, Biomedical Informatics and Medical Education, School of Medicine, University of Washington

Project Implementation Team: Beth Ripley, MD, PhD, Professor, Department of Radiology, School of Medicine; Sarah Pine, MLIS; Dmitry Levin; Gili Meerovich, Pfieffer Partners; Ryan James, PhD; Carlos De La Peña, MD, MBA, MHA; Sean Mooney, PhD; Eric Van Eaton, MD; Emily Patridge, MLIS, AHIP; Deric Ruhl; Adam Garrett; Margarethe Søvik, PhD

Partner Organizations: University of Washington Libraries, Health Sciences Library, Seattle, WA, USA
Pfeiffer Partners, Los Angeles, CA, USA
Pear Medical, Seattle, WA
Center for Multidimensional Medicine, School of Medicine, University of Washington, Seattle, WA, USA
UW Medical Center, Department of Surgery, Seattle, WA, USA
Institute of Translational Health Sciences, Seattle, WA, USA
VID Specialized University, Bergen, Norway

Statement of National Need

Virtual reality (VR) techniques provide opportunities beyond traditional data visualization in their ability to create complex, three dimensional models in high definition for analysis. As evidenced in the pioneering work of Dr. Patricia Brennan, Director of the National Library of Medicine, VR is being employed in the medical fields to improve patient interaction and student education[2]. VR techniques can also improve outcomes in medical intervention by providing new approaches to data analysis[3]. However, access to these techniques is dependent on access to physical space and specialized technologies that may be beyond the reach of a given team.

Libraries can provide the physical space, necessary equipment, and support in the form of information management and metadata services. Expertise in these areas is a critical component of success that librarians are uniquely positioned to provide. The addition of VR-based data visualization and 3D modeling to a library space would bring these innovative services to medical professionals, allowing them to address all the steps in the chain of 3D printing and VR from obtaining and formatting data sets to creating models for pre-procedural training and patient education. This translates into a one-of-a-kind center focused on the comprehensive picture of care. The techniques developed and knowledge gained from this project could be put to use in other libraries around the country, improving and strengthening library services in the field of virtual reality and data services. In addition, the UW HSL's incoming Fulbright Scholar, Margarethe Søvik, would have the opportunity to take the knowledge gained in this initiative back to her home country of Norway.

Project Design

This initiative would consist of four major phases: 1) partner with the Center for Multidimensional Medicine at the University of Washington School of Medicine to develop a VR studio, 2) develop and implement a plan to train librarians to create a virtual anatomical library in partnership with radiologists, cardiologists, and surgeons, 3) create a website in collaboration with the Center for Cardiovascular Innovation to promote VR use in the medical community, 4) evaluate VR library and lab space.

National Impact

This initiative will forward the IMLS mission to advance innovation in libraries by providing new technologies and services to both libraries and their users. Potential outcomes include 1) enhancing patient clinical care, 2) reducing barriers to effective data visualization in medical science, 3) providing new methods for analyzing existing datasets, 4) offering new technology-based library services.

Budget

EXPENDITURE CATEGORY	TOTAL ESTIMATED COST
SUPPORT PERSONNEL	**$ 3,187**
Linux Developer (40 hrs, @$30.64/hr.)	$ 1,226
Research Scientist (25 hrs, @$45.00/hr.)	$ 1,125
Metadata Librarian (25 hrs, @$33.43/hr.)	$ 836
FRINGE BENEFITS (FY17 rate @ 32.4%)	**$ 1,033**
EQUIPMENT & TECHNOLOGY _ Virtual Room set from OCULUS	**$ 4,274**
CONSULTANTS	**$ 9,750**
Design Consultant for Space	$ 6,500
Website Design	$ 3,250
TOTAL DIRECT COST	$ 18,244
OVERHEAD/IDC (37.0%, University of Washington)	$ 6,750
TOTAL	$ 24,994

References

1. Centers for Disease Control and Prevention. (2015). *Heart Disease Facts*. Retrieved from https://www.cdc.gov/heartdisease/facts.htm
2. Brennan, P., Ponto, K., Casper, G., Tredinnick, R., & Broecker, M. (2015). Virtualizing living and working spaces: Proof of concept for a biomedical space-replication methodology. Journal of Biomedical Informatics, (57), 53–61. https://doi.org/10.1016/j.jbi.2015.07.007
3. Wake, N., Rude, T., Kang, S., Stifelman, M., Borin, J., Sodickson, D., … Chandarana, H. (2017). 3D printed renal cancer models derived from MRI data: application in pre-surgical planning. Abdominal Radiology. https://doi.org/10.1007/s00261-016-1022-2