

# Digital Realities & Academic Research

Allison Herrera - Technology & Communications Coordinator

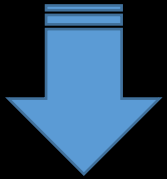


The University of Massachusetts Medical School  
National Network of Libraries of Medicine, New England Region  
National Public Health Coordination Office

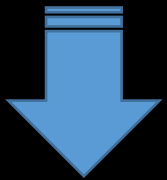


# Outline & Learning Objectives

Terminology & Background



NNLM & Digital Reality  
NIH/Libraries & Data



Researchers & Digital Realities

Objectives:

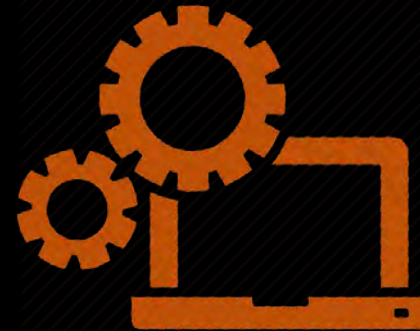
Examine and contemplate  
some of the challenges and  
strengths related to digital  
realities, data, and research

Consider how digital reality  
content types are being used  
as supplemental material

Learn what role libraries can  
play in this shift to support  
researchers

# About Me

- BFA - Visual Culture Education  
Concentration in 3D Media
- Masters Library &  
Information Sciences
- Computer Sciences – JAVA, R, Data  
Analysis, Visualizations, Databases
- Archives, Museums, Cultural  
Libraries, Health Science Centers
- Gamification, Human Computer  
Interaction, and Cultural Identity  
Exploration



# Terminology



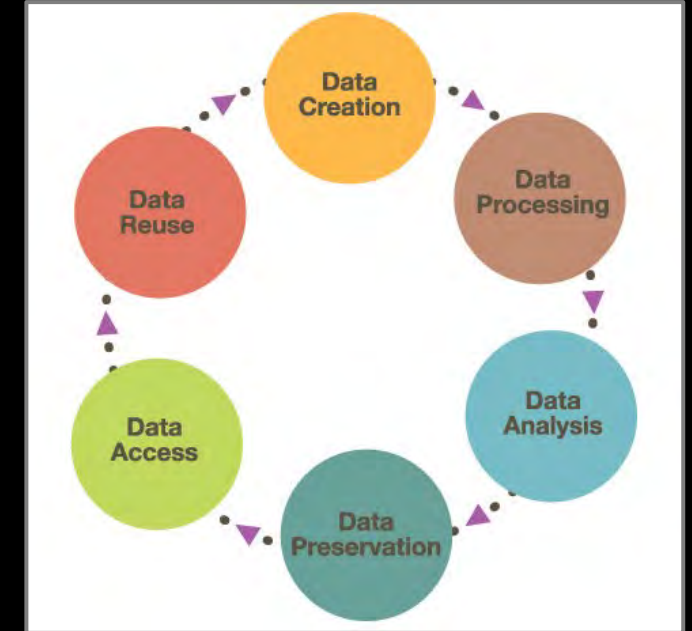
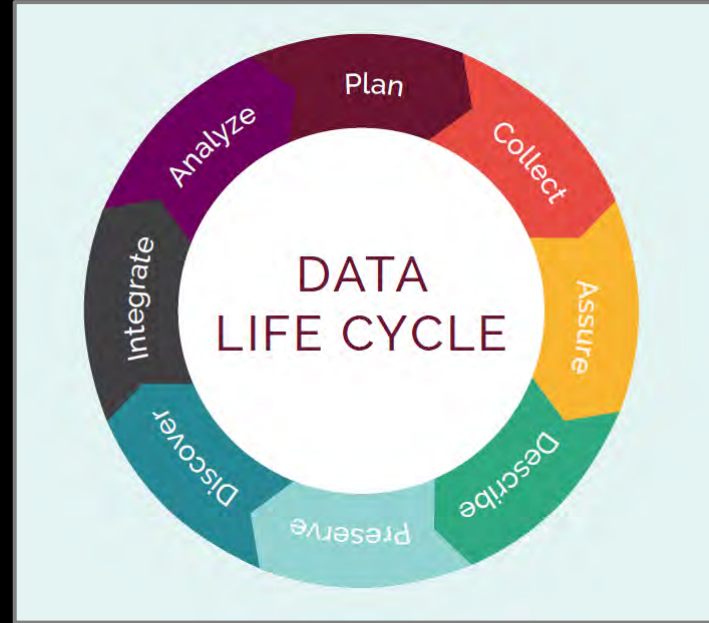
Noteworthy phrases:

Virtual Reality  
Augmented Reality  
Mixed Reality  
Digital Realities





# Data Life Cycle

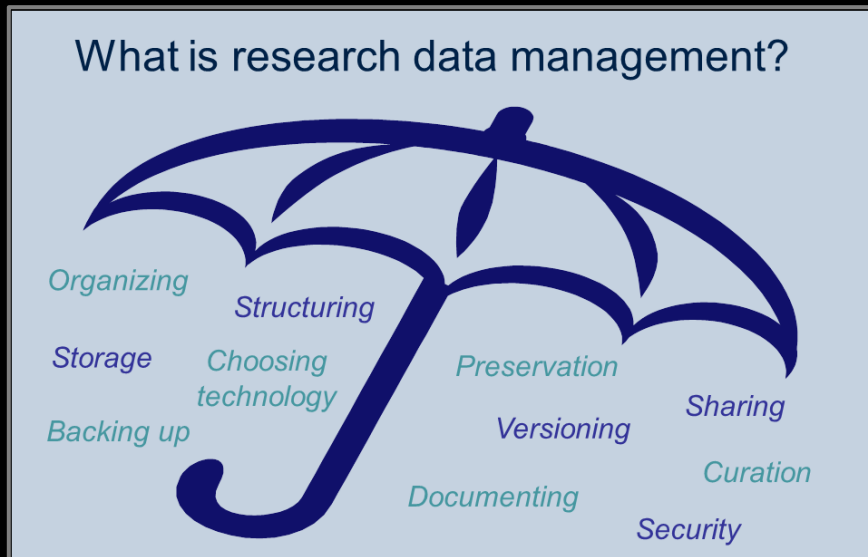


To understand data's role in the overall research process, and thus how to manage data better, we must start by breaking the research process down into the steps that make it up. (Briney, 2015)

# Research Data Management



Research data management (often seen as RDM) is a term that describes the organization, storage, preservation, and sharing of data collected and used in a research project.



Researchers need to be able to improve, enhance, and professionalize their research data management skills to meet the challenge of producing the highest quality shareable and reusable research outputs in a responsible and efficient way (Corti, 2014)

# Background of NNLM



U.S. Department of Health  
& Human Services (HHS)



National Institutes of Health



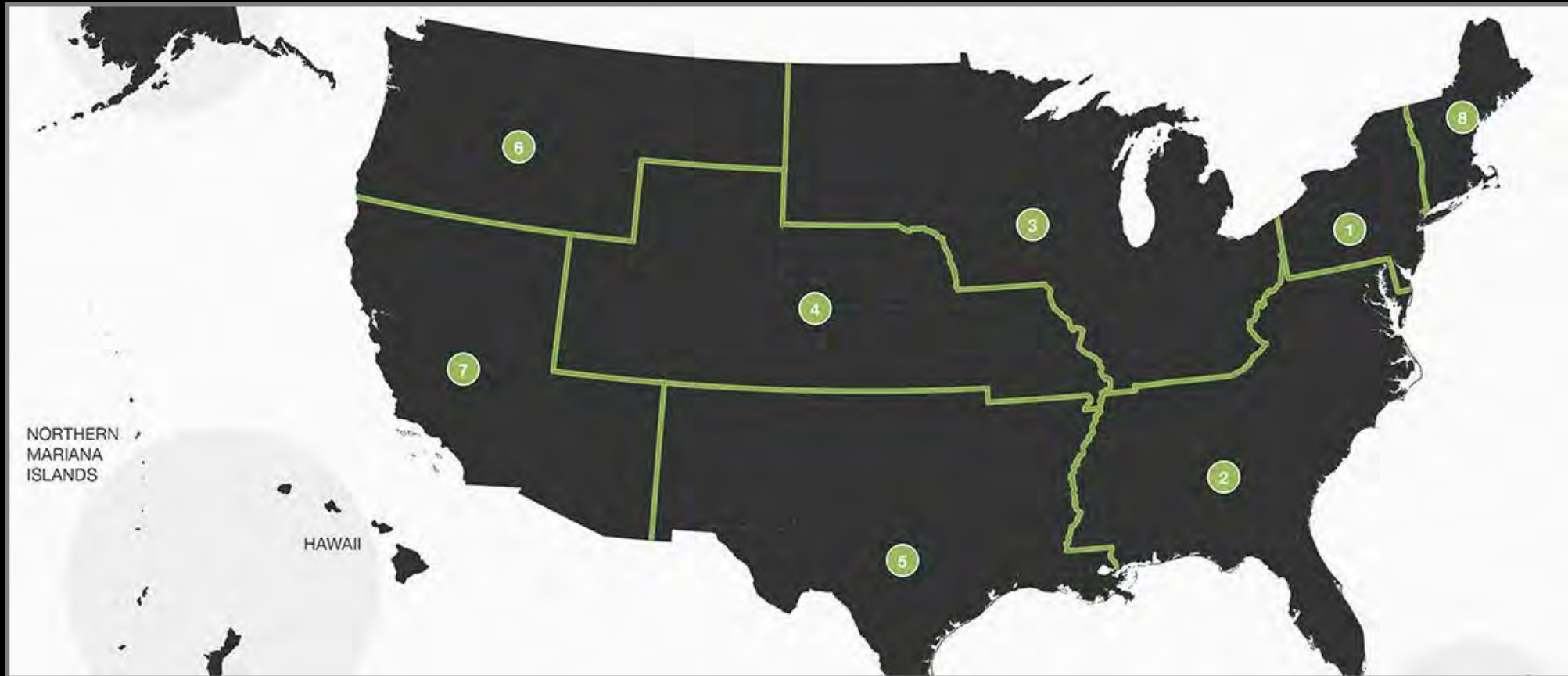
National Library of Medicine



National Network of  
Libraries of Medicine

The mission of the NNLM is to advance the progress of medicine and improve the public health by providing all U.S. health professionals with equal access to biomedical information and improving the public's access to information to enable them to make informed decisions about their health.

# NNLM Regions



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## New England Region (NER)

NER proudly serves: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. The New England Region is based in Worcester, MA, at the University of Massachusetts Medical School.



# NNLM NER – Ongoing VR Project



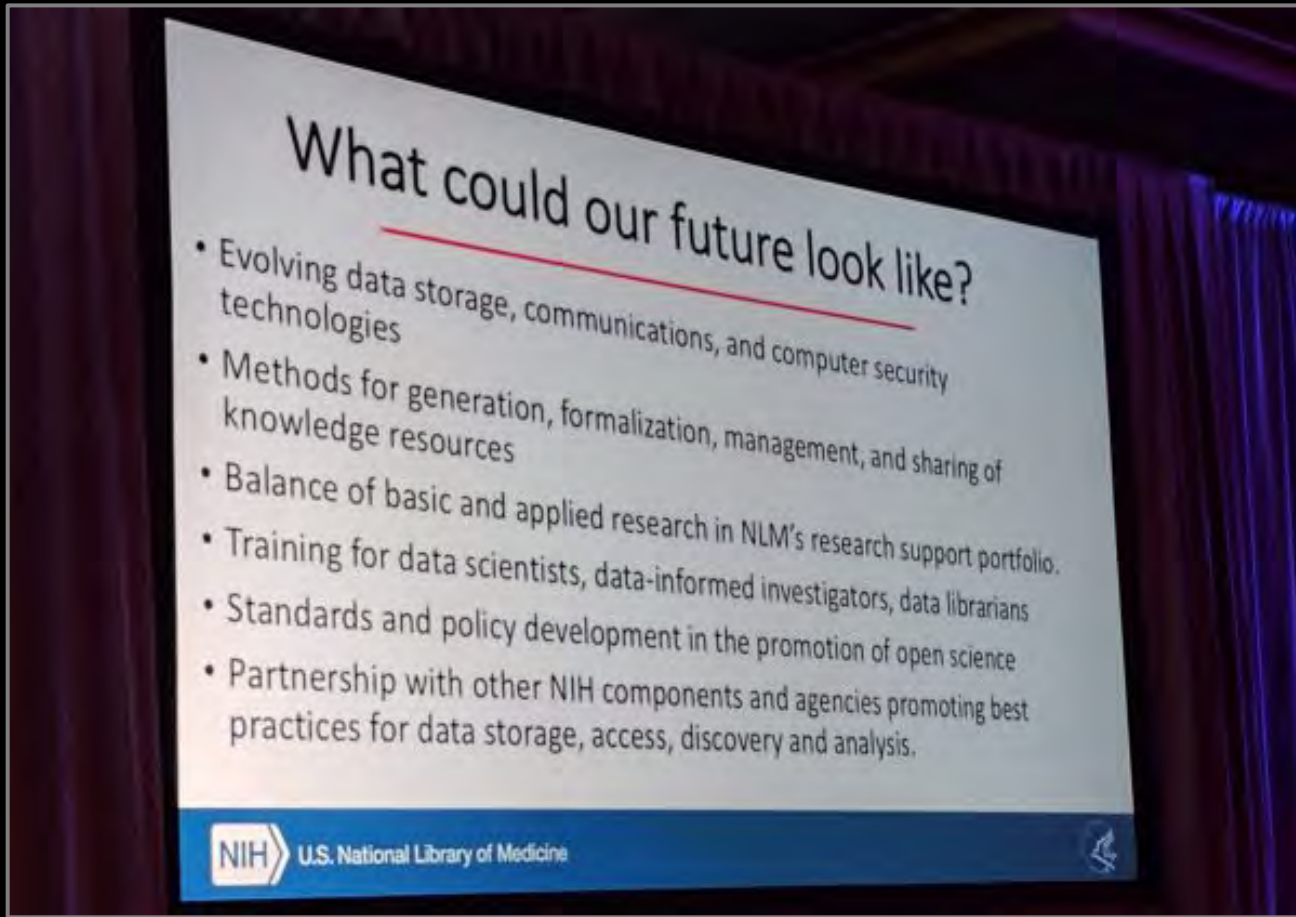
Empathy Learned Through an Extended  
Medical Education Virtual Reality

University of New England  
College of Osteopathic Medicine




Innovative learning modules are utilized  
to augment medical students' learning  
about empathy in relation to older adult  
health care.

# Libraries Future Roles for Supporting Researchers



What the library was, which was a stable repository of knowledge, is no longer possible, now the big action is moving upstream to the data. The dynamic interplay of knowledge and medicine is where we're going and where we want to be. (Brennan, 2017)

# Libraries Future Roles for Supporting Researchers

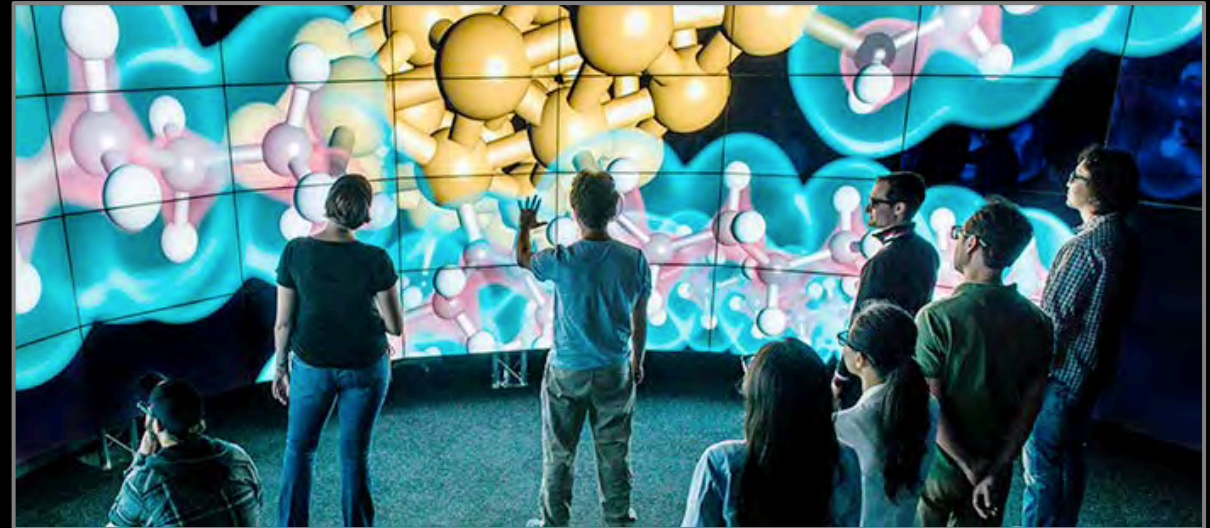
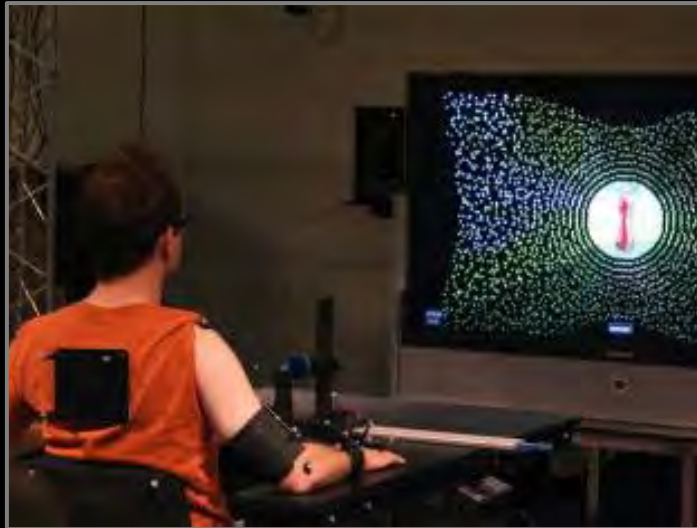


The screenshot shows the NIH NLM NNLM website's 'Manage Data' section. The header includes the NIH NLM NNLM logo, navigation links for 'REGIONS | OFFICES | HELP', a search bar, and a main menu with 'DATA HOME', 'About', 'Subject Primers', 'Manage Data' (selected), 'Store Data', 'Share Data', and 'Professional Development'. The main content area features a large green abstract graphic with white squares. Below the graphic are buttons for 'View', 'Edit', 'Revisions', and 'Unpublish'. The main heading is 'Why Manage Your Data?' followed by a subheading 'Data Management' and a paragraph: 'Increasingly libraries are planning and implementing data management services that support the discovery, access, sharing, archiving, and preservation of research data generated at their institutions. Why should'. On the right, a sidebar titled 'IN THIS SECTION' lists links: 'Why Manage Your Data?', 'Management Plan', 'Data Life Cycles', 'Data Tools', and 'Policy'.

- Growing extramural research
- Online Data Management Resources
- Direct deposit of data to support open data movements
- Training for data scientists, researchers, and librarians
- Policy development to promote open access
- Increasing understood value and use of big data

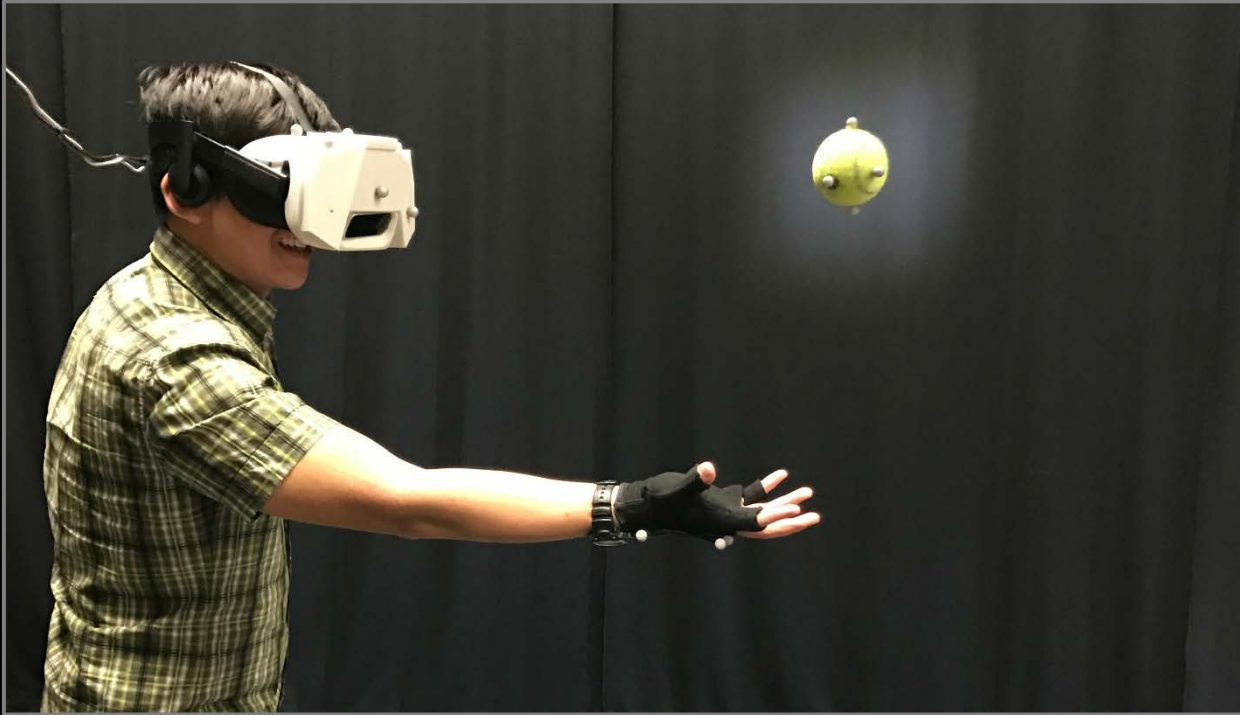


# Researchers & Digital Realities





# Strength – Collecting Data



A positive note in relating digital realities to the data cycle of “Data Creation” is there seems to be more possibilities to easily collect data. Considering how HMDs and simulation gear can track a variety of user actions: eye-tracking, head movement, general body language, the time that it takes users to make specific motions, etc.

IDENTIFYING ANXIETY THROUGH TRACKED HEAD MOVEMENTS IN A VIRTUAL CLASSROOM  
Won A. S., Perone B., Friend M. , Bailenson J. N. (2016). *Cyberpsychology, Behavior, and Social Networking*. 19(6): 380-387.

# Challenge – Collecting Data



On the other hand, there is also a challenge that has risen in the same sphere of thought. When considering digital reality technologies and the stage of “Data Creation” it is also easier to draw on data from multiple sources, and run into interoperability issues between data sets.

IDENTIFYING ANXIETY THROUGH TRACKED HEAD MOVEMENTS IN A VIRTUAL CLASSROOM  
Won A. S., Perone B., Friend M. , Bailenson J. N. (2016). *Cyberpsychology, Behavior, and Social Networking*. 19(6): 380-387.

# Challenge – Data Security



Another researcher data challenge is related to the highly relevant data stage and management strategies revolving around “Data Security”  
This data will ideally be anonymized, kept in secure conditions, and types of sensitive data should be dealt with accordingly.

**AUTOMATIC DETECTION OF NONVERBAL BEHAVIOR PREDICTS LEARNING IN DYADIC INTERACTIONS**  
Won, A. S., Bailenson, J. N., & Janssen, J. H. (2014). Automatic detection of nonverbal behavior predicts learning in dyadic interactions. *IEEE Transactions on Affective Computing*, 5 (2), 112-125.

# Challenge – Data Storage



The next challenge that is significant to both RDM and the data life cycle is that of new digital reality data storage. This issue isn't necessarily new, but it's progressing quickly and a concern for researchers and publishers alike.



# Challenge – Taxonomies



In research and the industry, there are currently many unique definitions, taxonomies, and technologies for the different types of digital reality technologies. Some researchers even view these “technologies” (such as AR or VR) as academic concepts rather than types of technologies.

Mixed Reality, Augmented Virtuality, Augmented Virtual Reality, Transmogrified Reality, Dual Reality

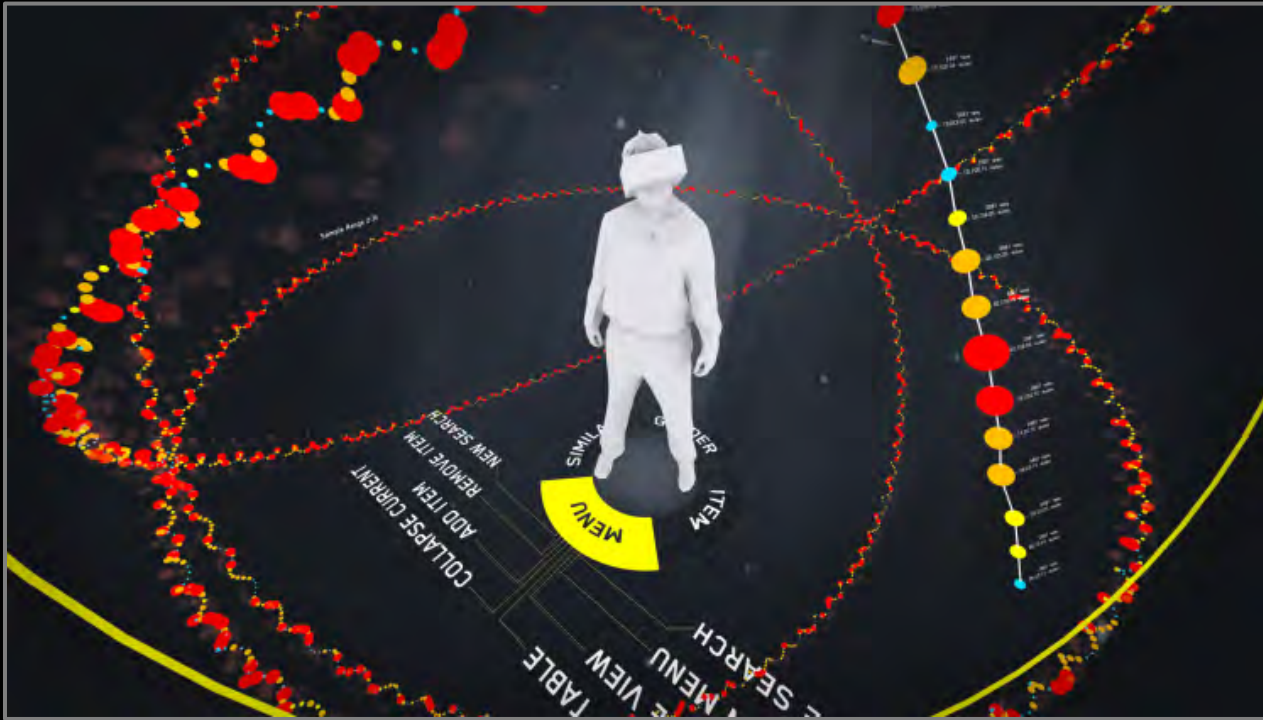
# Challenge – Supplemental Material



One of the most interesting challenges in relation to digital reality technologies is that these different content types are treated as supplemental material when being published. In the data life cycle this could be categorized as a part of “Data Publication” and “Data Sharing”

Some examples of supplemental material policies online: [Oxford Academic](#), [American Psychological Association](#), [Society for Industrial and Applied Mathematics](#), [Journal of Neuroscience](#)

# Strength – Data Visualizations



One of the most popular pros that I've seen for researchers is the idea of being able to share the research data with VR. This strength could be a part of the "Data Sharing" part of the data life cycle, or a couple other stages, depending on how it's utilized.

Olshannikova, E., Ometov, A., Koucheryavy, Y., & Olsson, T. (2015). Visualizing Big Data with augmented and virtual reality: challenges and research agenda. *Journal of Big Data*, 2(1), 22.

# Concluding Remarks & Questions

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Allison Herrera

Technology & Communications Coordinator

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Allison.Herrera@umassmed.edu



@AllisonKHerrera



508-856-5979 (office)





# Research

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Corti, L., Van den Eynden, V., Bishop, L., & Woollard, M. (2014). *Managing and sharing research data: a guide to good practice*. Sage.

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Olshannikova, E., Ometov, A., Koucheryavy, Y., & Olsson, T. (2015). Visualizing Big Data with augmented and virtual reality: challenges and research agenda. *Journal of Big Data*, 2(1), 22.

Won, A. S., Perone, B., Friend, M., & Bailenson, J. N. (2016). Identifying Anxiety Through Tracked Head Movements in a Virtual Classroom. *Cyberpsychology, Behavior, and Social Networking*, 19(6), 380-387.

Won, A. S., Bailenson, J. N., Stathatos, S. C., & Dai, W. (2014). Automatically detected nonverbal behavior predicts creativity in collaborating dyads. *Journal of Nonverbal Behavior*, 38(3), 389-408.

Wu, H. K., Lee, S. W. Y., Chang, H. Y., & Liang, J. C. (2013). Current status, opportunities and challenges of augmented reality in education. *Computers & Education*, 62, 41-49.