

Presenter: David

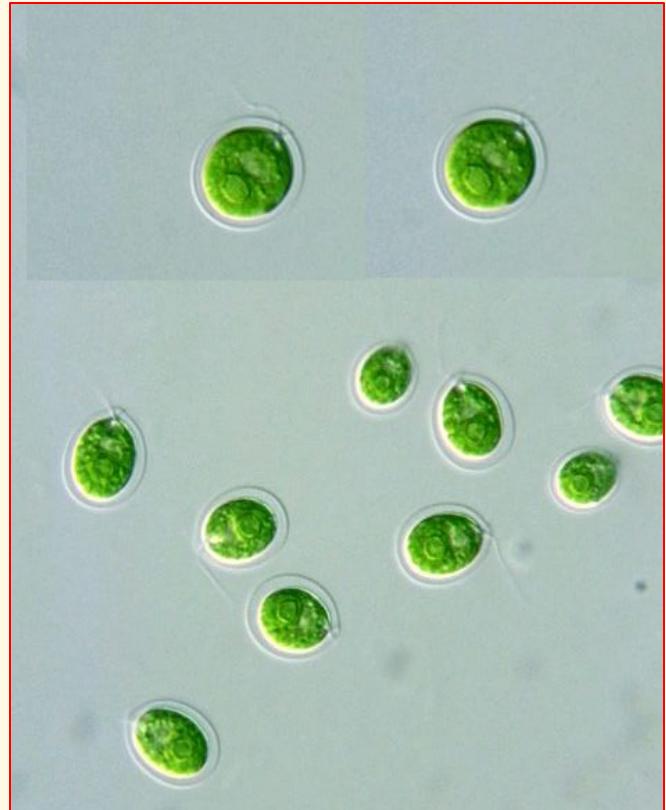
Article 1: “From Virtual Reality to Immersive Analytics in Bioinformatics”
Sommer et. al (2018)

Article 2: “Opportunities and Challenges for Data Physicalization”
Jansen et. al (2015)

From Virtual Reality to Immersive Analytics in **Bioinformatics**

Main contributions

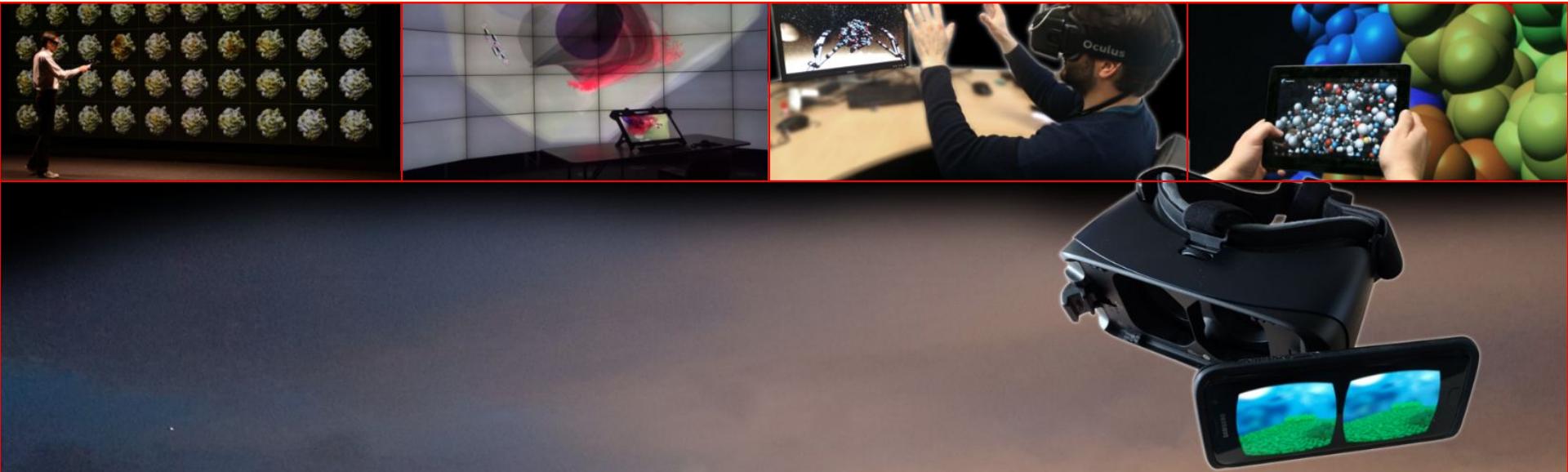
- Provided “**a path from VR to Immersive Analytics in the field of Bioinformatics**” by reviewing different biovis projects
 - Evaluation of AR for molecular visualizations with the Hololens
 - Content Creation - Stereoscopic 3D animations of unicellular organisms
 - Molecular Dynamics Visualization in Unity
 - “Semantics to describe semantically linked multi-dimensional molecular data and its interactive visualization.”



From Virtual Reality to **Immersive Analytics** in Bioinformatics

Contribution to immersive analytics

- Introduce and discuss VR applications for visualization on the molecular level



From Virtual Reality to Immersive Analytics in **Bioinformatics**

Why does this paper cite Chandler et. al.?

- “To extend this approach to VR-related technology, the term Immersive Analytics was coined by Chandler et al.:

Immersive Analytics investigates how new interaction and display technologies can be used to support analytical reasoning and decision making”



From Virtual Reality to Immersive Analytics in **Bioinformatics**

Methodologies

- The applications that are referenced were showcased at two separate conferences at the 2018 Electronic Imaging Symposium in Burlingame, California
- Authors claim that the audience was enthusiastic about VR and AR
- These applications used the Microsoft Hololens, Unity, WebVR and “The HIVE”



From Virtual Reality to Immersive Analytics in **Bioinformatics**

Is the evidence convincing?

- The authors did not provide any figures or images of their visualization software in this paper
- It was difficult to find any of the artifacts online
- They do not argue that the tools they made are particularly useful, although they do suggest the people were excited to use the technology

From Virtual Reality to Immersive Analytics in **Bioinformatics**

Are the results compelling

- It's hard to say
- The authors didn't compare their 3D visualizations to 2D homologs or propose reasoning as to why it is now better, or what about the technology that makes it better
- Without being able to see the software they created, it's hard to evaluate how useful it is

From Virtual Reality to Immersive Analytics in **Bioinformatics**

Where is the paper published?

Journal of Integrative Bioinformatics, 2018

Covers topics in:

- Molecular Databases, Information Systems and Data Warehouses
- Integration of Data, Methods and Tools
- Metabolic and Regulatory Network Modeling and Simulation
- Signal Pathways and Cell Control
- Network Analysis
- Medical Informatics, Biomedicine and Biotechnology
- Integrative Approaches for Drug Design
- Integrative Data and Text Mining Approaches
- Integrative, whole cell and molecular modeling
- Visualization and animation



From Virtual Reality to Immersive Analytics in **Bioinformatics**

Who are the authors?

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Big Data Visual Analytics
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HIVE (Hub for Immersive Visualisation and eResearch)
Curtin University - Perth, Australia

Opportunities and Challenges for **Data Physicalization**

Data Physicalization

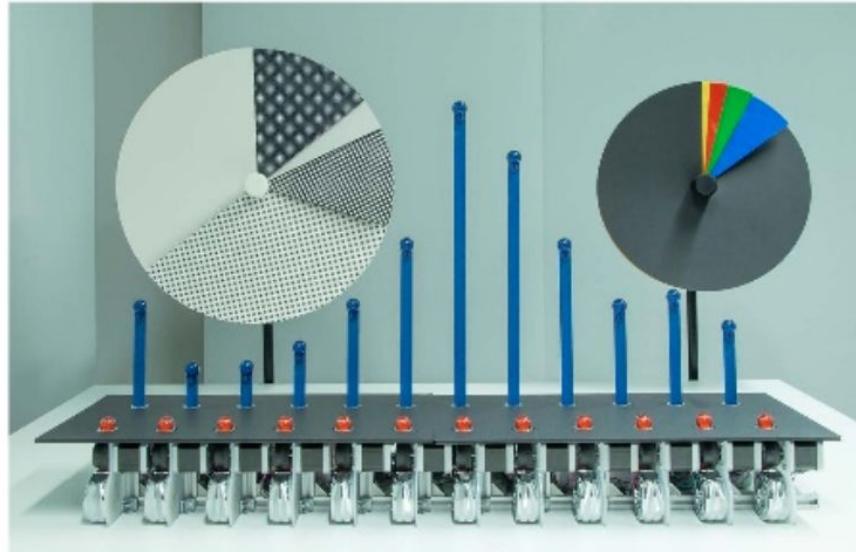
- “An emerging research area that uses **physical data representations** to help people explore and communicate data.”
- “A **physical artifact** whose geometry or material properties encode data.”



Opportunities and Challenges for **Data Physicalization**

Contributions to immersive analytics

<http://yvonnejansen.me/dataphys> (video, 30 seconds)



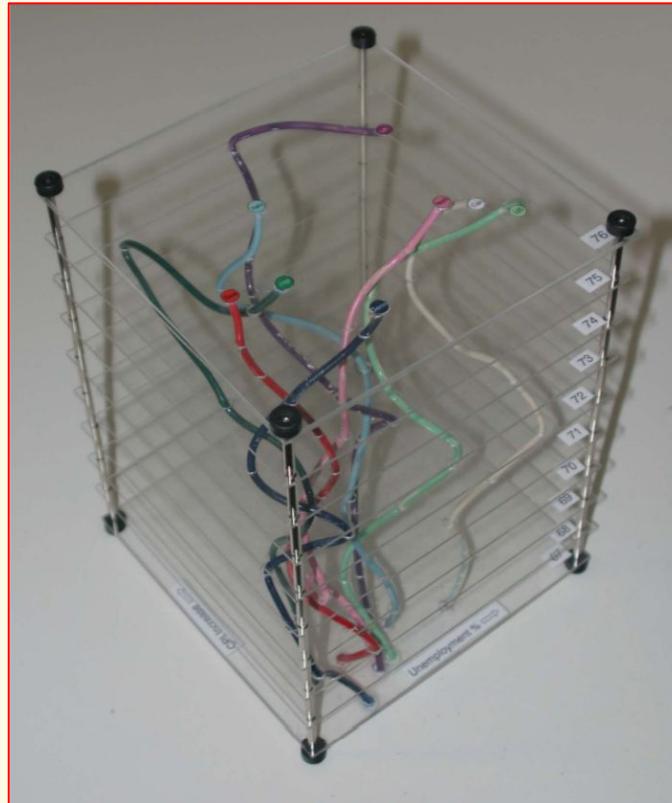
Physical Charts, MSR, 2014

Opportunities and Challenges for **Data Physicalization**

Why is this paper cited?

Chandler et. al. :

"In 2003 construction of this physicalization was a time-consuming process, constrained by the materials and tools available. In 2015 digital fabrication is emerging as a technology with huge potential to allow people to engage with data in new ways"



Opportunities and Challenges for **Data Physicalization**

Is the evidence convincing?

Physicalization leverages our perceptual exploration skills better than classical computer setups

Future Usage Scenarios For Physicalizations

- *Science Museum* - interactive climate change exhibits
 - Miniature hurricane diorama with fog & air pressure
- *Explaining Complex Systems* - 3D printed economic model
 - Physicalized line charts of economic data as w
- *Neurosurgical Planning*
 - Physicalize medical images using “programmable matter”
 - Manipulate brain data in physical space



Opportunities and Challenges for **Data Physicalization**

Are the results compelling?

Make data accessible

- Physicalization enables **non-visual senses**
 - **Haptic** - texture, stiffness, temperature, weight
 - **Sound** when interacting with an object
 - **Smell and Taste ... ?**

Engaging People

- *Data sculptures*
- “Always on” - ambient display
- Large scale - can walk around it



Persuasive - scale, performance

Rich

Poor

Opportunities and Challenges for **Data Physicalization**

CHI 2015, Crossings, Seoul, Korea

A showcase of the advances in:

- Computer science
- Cognitive psychology
- Design
- Social science
- Human factors
- Artificial intelligence
- Graphics
- Visualization
- Multimedia design
- Other disciplines



Opportunities and Challenges for **Data Physicalization**

Who are the authors?

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