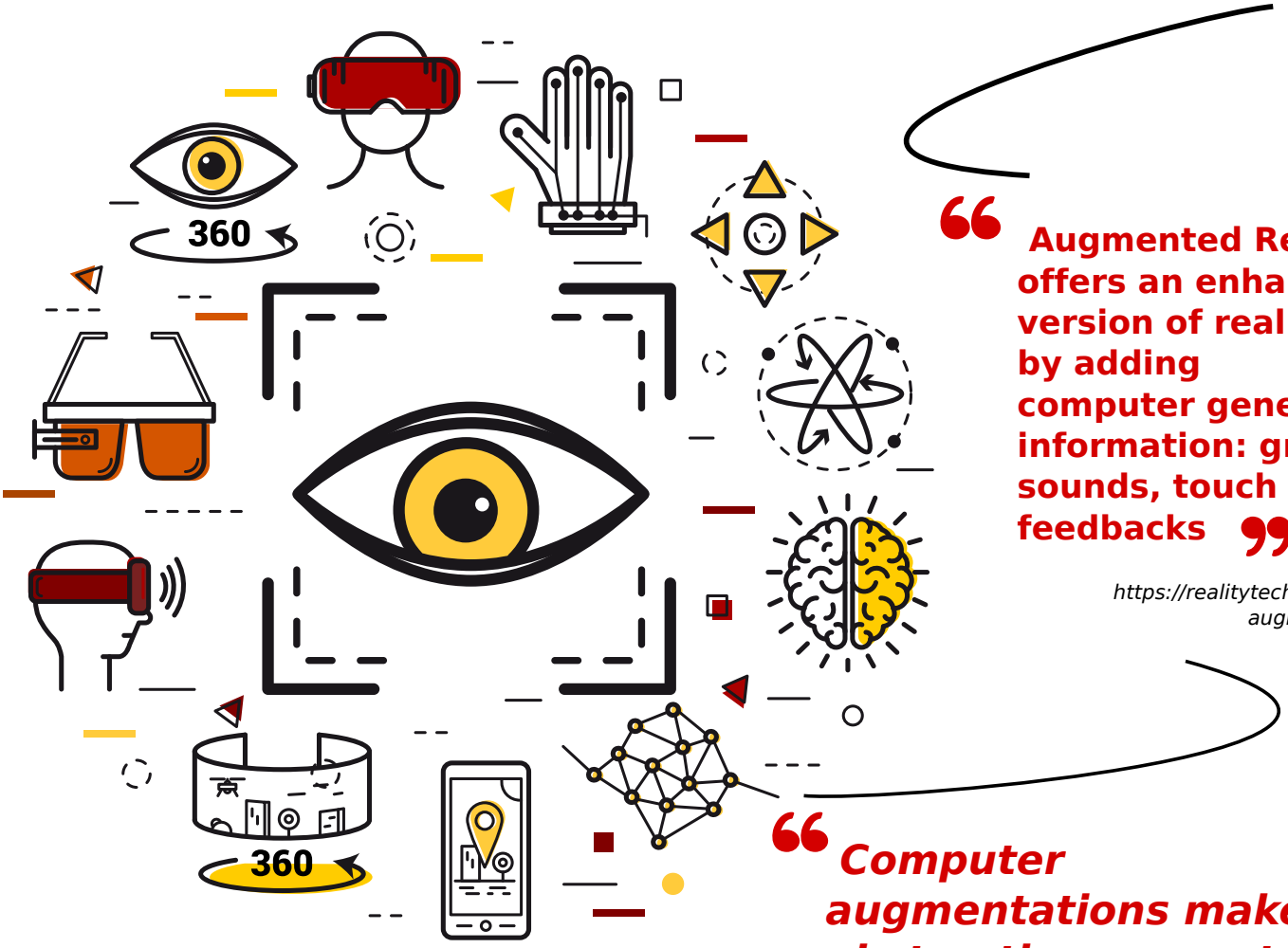

> **Augmented Reality offers an enhanced version of reality by adding computer generated information: graphics, sounds, touch feedbacks**

https://realitytechnologies.com/augmented-reality

> ***Computer augmentations make abstractions more tangible***

Fleck et al. *Frontiers in ITC*, **2016**, 3, 1-13.

UNIVERSITY OF CALGARY

Introduction to Augmented Reality for Teaching and Learning

Taylor Institute for Teaching and Learning

October 30th, 2019

Why Augmented?

- Interactive learning
- Portable and less expensive materials: cellphones/tablets
- Enrich ways of telling a story
- Foster intellectual curiosity
- Visit different *times* and *scales:* past-present-future and micro-macro universes

Research

Over the past couple of years, key progress has been made in regards to eXtended reality(XR) technologies such as virtual, augmented and mixed reality. These technologies open new perspectives and opportunities to immerse learners in the curriculum (Fleck et al., 2016). The content can be augmented in terms of space and time dimensions in order to enhance the learning process of intangible and complex concepts (Borrel et al., 2017; Wolle et al., 2018; Kwang Tee et al., 2018; Jones et al., 2017; Mattews et al., 2018; Martin et al., 2011).
Interactive systems based on Augmented Reality (AR) hold great promise for enhancing how to learn and understand abstract phenomena (Fleck et al., 2016).

Resources

3D Modelling for Beginners:
Tinkercad:https://www.tinkercad.com
SketchUp: https://www.sketchup.com
molview: http://molview.org
Reality Convert: http://www.realityconvert.com

Advanced 3D Modelling:
3D Modelling for Engineers: AutoDesk Inventor, CATIA, IronCAD, Rhinoceros, PTC Creo Parametric, Solid Edge, SolidWorks, NX.
3D Modeling for Artists & Scientists: Blender, ZBrush, Maya, Pymol, VMD, Chimera.

3D Model repositories:
https://sketchfab.com
https://artsandculture.google.com/project/cyark
https://poly.google.com
https://turbosquid.com/Search/3D-Models/free/blend
https://blendernation.com/category/art/repositories
https://3dprint.nih.gov

Some tips about file formats:
http://www.augment.com/help/3d-file-format-guidelines
https://www.stratasysdirect.com/resources/tutorials/how-to-prepare-stl-files

Apps & Tools Development:
https://unity3d.com/
https://www.vuforia.com/

Do you have an idea? Share it with us!

Here at UCalgary:
LabNext Makerspace at **TFDL:** https://library.ucalgary.ca/labnext
CCIT Collaboration Centre: http://collaborationcentre.ca/
Taylor Institute for Teaching and Learning: https://taylorinstitute.ucalgary.ca/

Examples

Download the App in your device and scan the QR codes:

AUGMENT

Ibuprofen

3D Shapes

Carbon Nanotube

Ion channel Protein

House Prototype

Sources

Augment:
https://augment.com/education/
Educause:
https://library.educause.edu/topics/emerging-technologies/extended-reality-xr
Reality Technologies:
https://www.realitytechnologies.com/augmented-reality/

Literature:
Borrel et al. *Bioinformatics*, **2017**, 33(23), 3816-3818.
Fleck et al. *Frontiers in ITC*, **2016**, 3, 1-13.
Jones et al. *J.Chem. Educ.*, **2018**, 95, 88-96.
Kwang Tee et al. *J. Chem. Educ.*, **2018**, 95, 393-399.
Martin et al. *Computer and Educ.*, **2011**, 57, 1893-1906.
Mathews D. *Nature (Toolbox)*, **2018**, 557, 127-128.
Milgram P. et al. *SPIE*, **1994**, 2351, 282-292.
Wolle et al. *ACS Chem. Biol.*, **2018**, 13, 496-499.

“Virtual and augmented reality tools allow researchers to view and share data as never before. But so far, they remain largely the tools of early adopters”