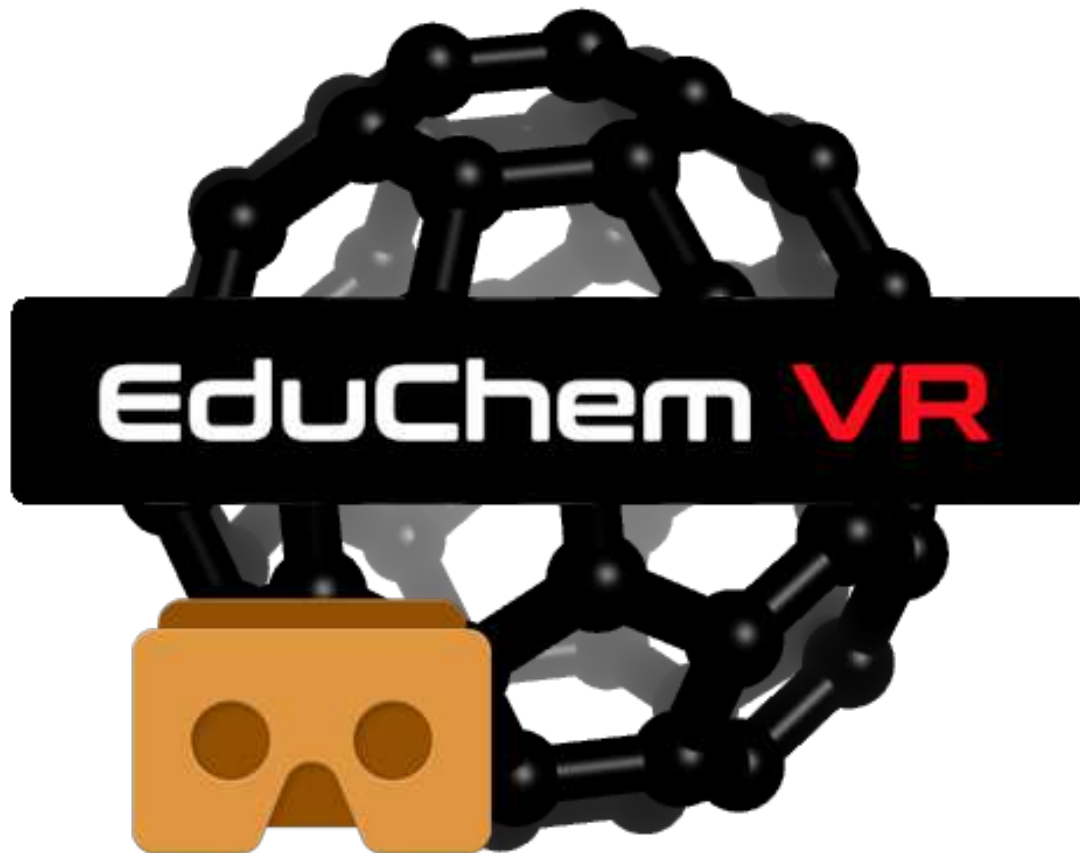


# Improving Chemistry Learning with Virtual Reality



*Nonconfidential company presentation (Dec 17, 2017)*

# Concept

We develop VR content to improve  
Chemistry learning



Our vision is to educate and inspire

By creating easily accessible VR content for smartphones  
we can reach anyone anywhere

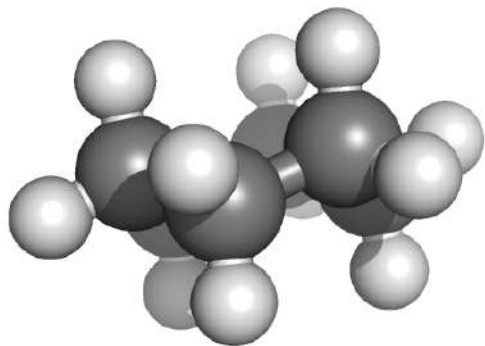
# Problem

## 2D to 3D: Many struggle with the conceptual transition

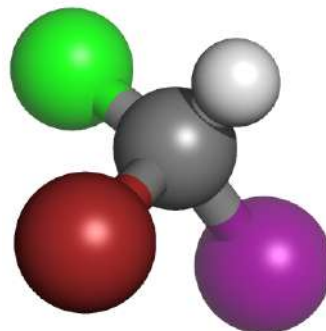
A fundamental problem is how to teach, conceptually and practically, students the transition of thinking of molecules as 2D-representations to real 3D-structures. Research shows that spatial thinking is very important for understanding and needs to be trained. VR facilitates such learning, especially for students with lower spatial ability.

## Examples of difficult to understand without 3D/VR:

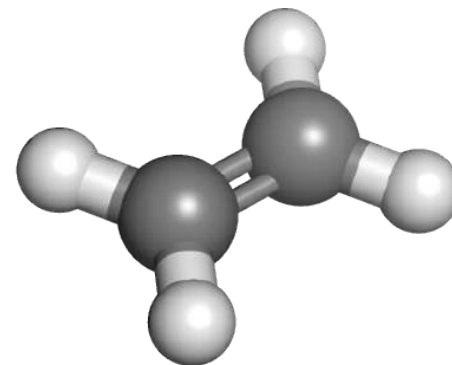
Molecular Geometries



StereoChemistry

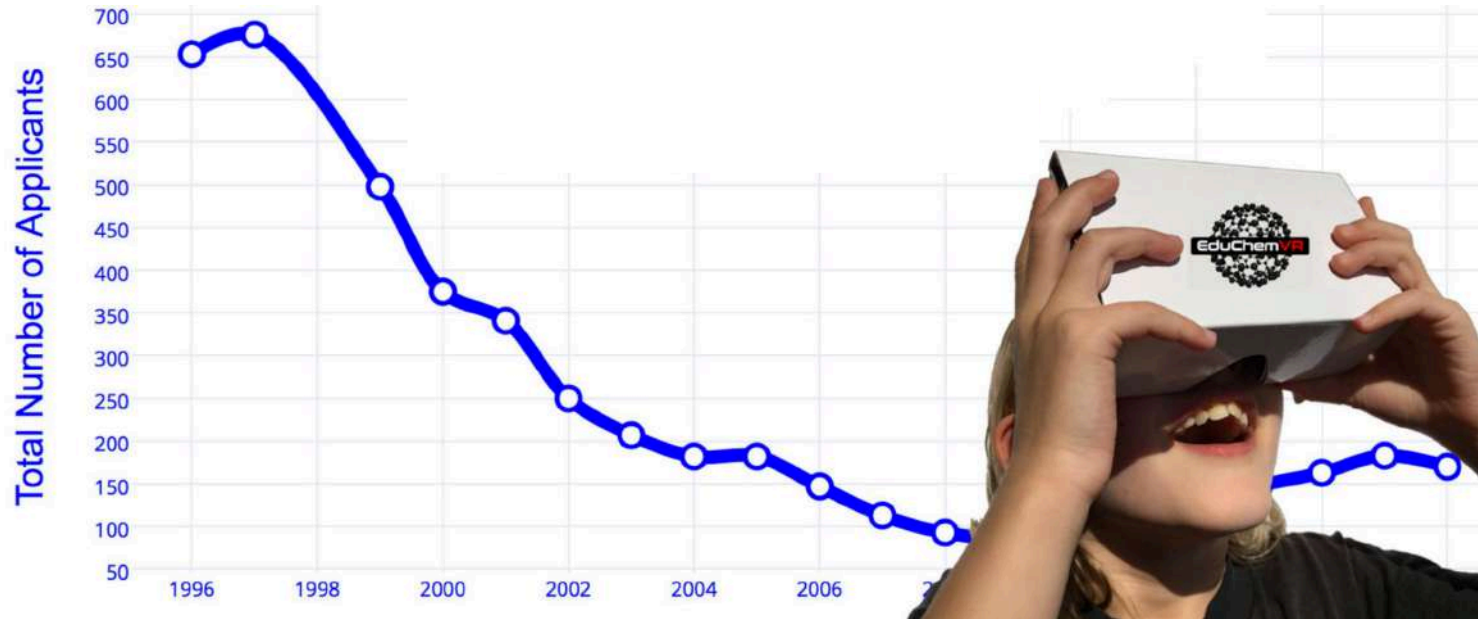


Hybrid Orbitals



# Another Problem

**Chemistry is not seen as an attractive school subject  
Leading to a decline in the number of students (and teachers).  
For example at the University of Gothenburg**



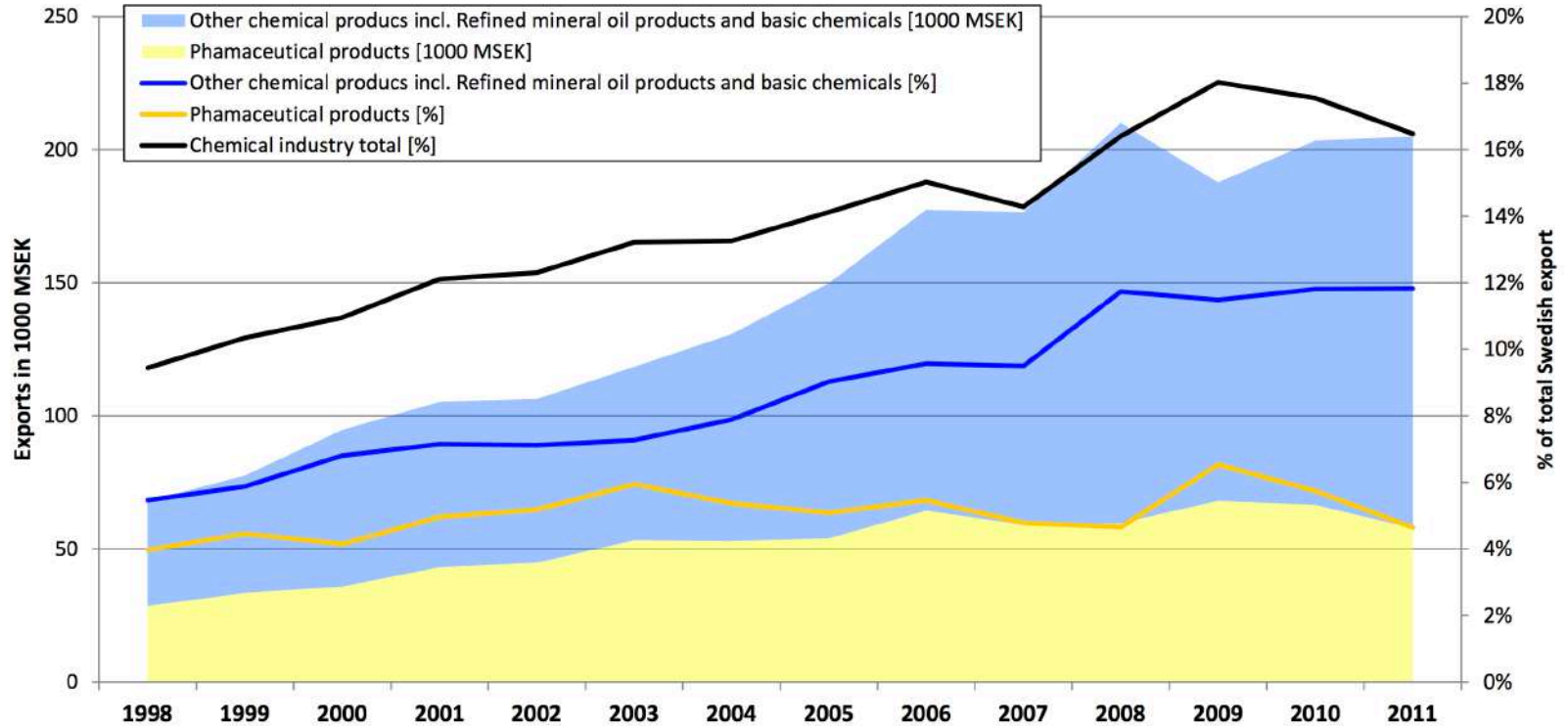
**Chemistry is often considered dull and dry and  
difficult to understand.**

**VR can serve a tool to motivate, inspire better learning**

# Impact

**Chemistry skills are needed in many, many areas**

To treat disease, environmental issues, develop new materials, within cosmetics, cleaning and petroleum refining, etc,..)



**16% of Swedens export from the chemistry industry**

(VINNOVA Analysis VA 2013:01 "[Chemical Industry Companies in Sweden](#)")

The Chemistry industry report difficulties in recruiting

# Mobile First

With recent advances in VR technology we can  
deploy on everyone's favorite tool: your  
smartphone

There are over two billion smartphones in use globally  
EduChem VR can basically reach anyone, anywhere



Google Cardboards: 1-20 USD



Samsung GearVR: 50-150 USD

Our approach is accessible, inexpensive and easy-to-use  
*thus attending to “*

*The biggest barrier [for using tech/VR in schools] is definitely access”*

A recent survey reveals that 83% of teachers wants easy-to-use VR in school



# Virtual Reality

*comes with an inherent wow factor!*

the VR market is expected to be huge:  
an [\\$80 billion market](#) (Forbes)

## The technology is becoming mature

- Gartner hype cycle: VR has reached the plateau of productivity, and approaching mainstream adoption.

## Great for understanding abstract concepts

- The Labster life science company demonstrated improved learning outcomes (76% higher scores) compared with traditional teaching ([Bonde \*et al.\* Nature Biotechnology, 2014](#)).

## Ideal for learning and educational purposes

- Research has shown that when you put a person in a place, they are more likely to remember it – retention of knowledge. It's great for engagement.

## More efficient than traditional tools

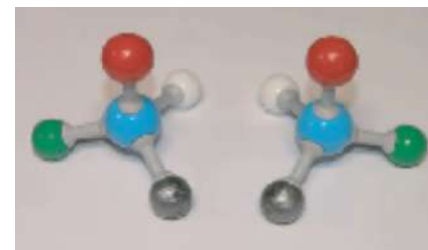
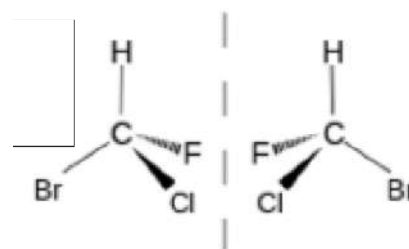
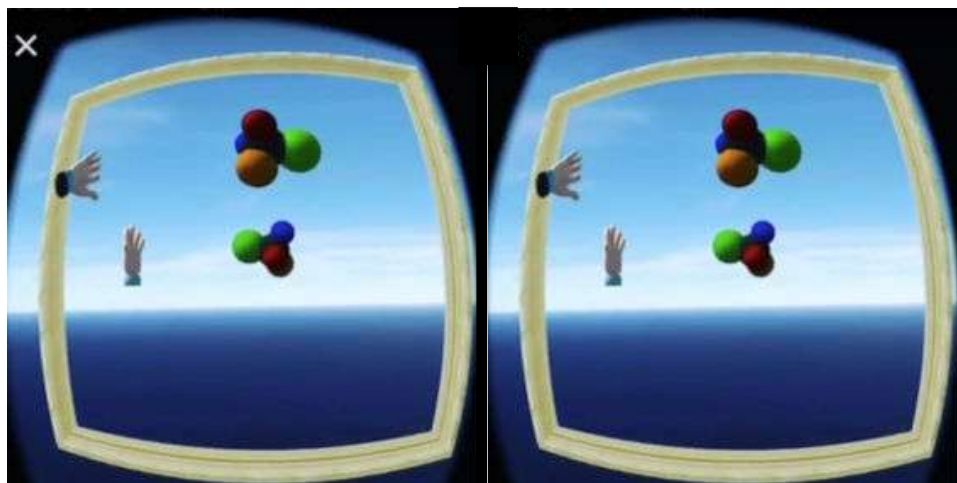
- *"It can take a day to set up an exercise using traditional physical molecular models. With EduChem VR apps this is instant"* Ass Prof. C-J Wallentin, University of Gothenburg

# Use-Case

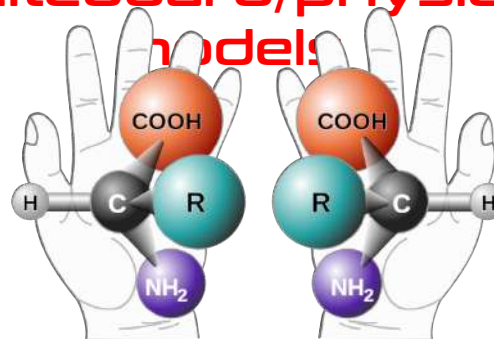
Compare explaining the importance of stereochemistry

with VR scenes

and traditional teaching



using pen&paper/  
whiteboard/physical  
models



We believe and aim to show that Virtual Reality experience is a more efficient and better as a learning tool.



# Monetization

## 1. Freemium mobile apps for Cardboards

Three apps for Android and iOS ('Learning Carbons VR', 'Learning MacroMol VR' and 'Learning StereoChem VR') have been released.

Downloaded in >50 countries.

## 2. Gear VR apps

Just released first version of Chemistry VR. This comes with higher performance than Cardboards.

## 3. A comprehensive educational chemistry platform

Underway! Experience and learn about important concepts like atom orbitals, hybridization, stereochemistry and molecular geometries, all in interactive VR. The target is University level, but also high-schools. Available on WebVR.

## 4. Tailor-made VR apps, Consulting and Lectures

We developed on demand for Science Centers. All major VR platforms are supported. We can consult and do occasionally set-up workshops and provide lectures upon request. We can provide support, installation, maintenance as well as further development of enterprise version "[Molecular Rift v2](#)"

*\* Note that we do not necessarily restrict ourselves to chemistry and molecular biology education. We are open for other areas (physics, math) and models of collaboration.*

# Freemium Apps

1. one to explore different carbons forms
2. one to explain the concept of stereochemistry,
3. and one to explore macromolecular structures

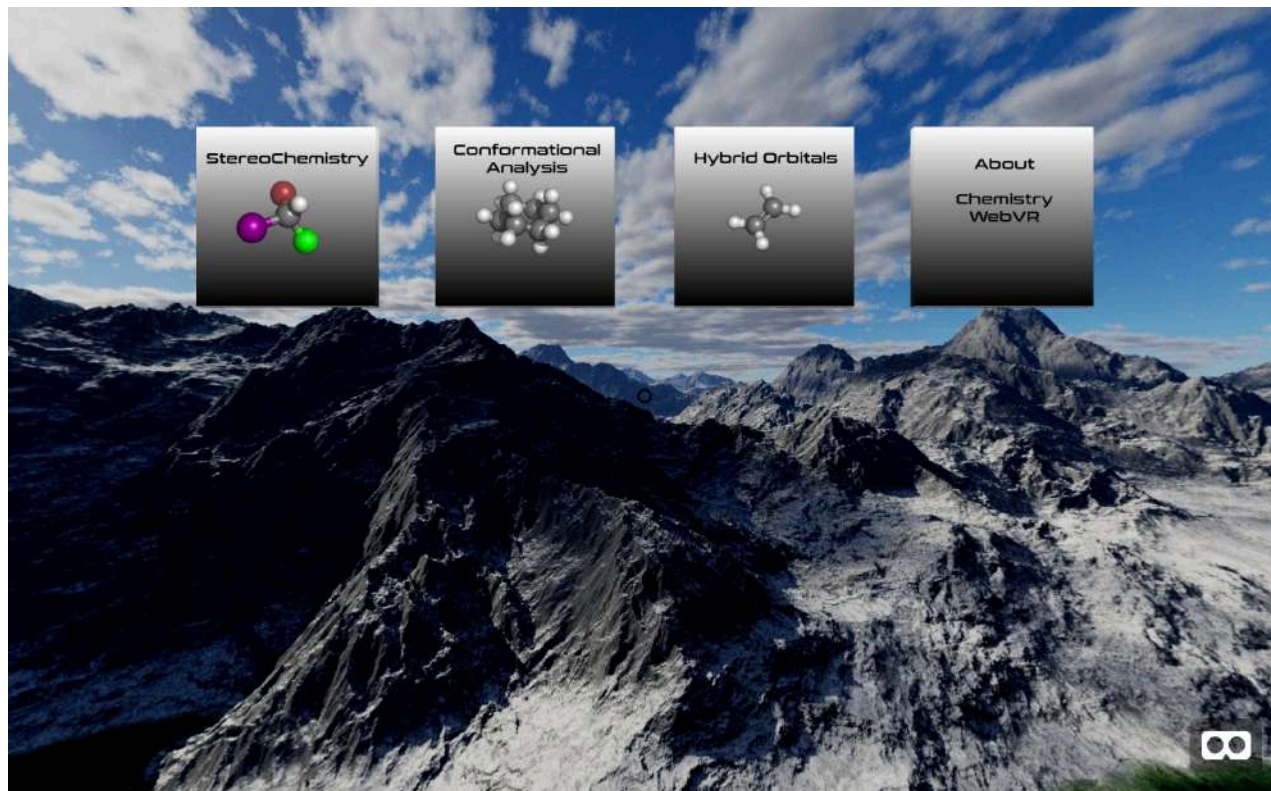


And just released! **“Chemistry VR”** on Oculus Store for Gear VR



# Chemistry WebVR platform

Virtual reality direct in your web-browser



Experience and learn about important concepts like orbitals, hybridization, stereochemistry and molecular geometries.

**Sign up your institution!**

(Content is University level, and for ambitious high-schools)

# External Recognition

- Winner in [Moscow Agency of Innovations](#) "Open Challenge" Pharmacy Education competition.
- Selected as one of the [15 hottest EU start-ups](#).
- Listed as winner in "[Startup Europe Micro-Grants](#)".
- Selected finalist (top-6) among over 400 apps making the world a better place in the EU [2017 CER Prize](#) competition.
- Selected as one out of 15 finalists, among over 4300 ideas, on how to make the world a bit better in the Swedish [Swedbank Rivstart](#) competition.

*We like to see ourselves as social entrepreneurs  
A greater mission is to make the world a better place*

# In the press

EduChem VR in big [GP article](#) on the possibilities of chemistry VR.



Listed as a Swedish VR company to keep an eye on by [NyTeknik](#)

Highlighted in the financial magazine "Veckans Affärer"

Front cover in "The Medicine Maker"

Camilla Cars, 2016	Spelvärd	Stockholm	Kombinerar motionscykel med vr-upplevelse.
Carry Castle, 2016	Dataspel	Torslanda	Tvåmannastudio som satsar på vr-spel.
CLVR Works, 2016	Media, 360-produktion	Göteborg	Visar konserter i virtual reality.
Cortopia Studios, 2016	Dataspel	Stockholm	Ligger bakom prisbelönta spelet Wands.
Crunchfish, 2010	Programvara	Malmö	Utvecklar programvara för gästbaserade gränssnitt.
Diakrit, 1995	Fästighetsbranschen	Stockholm	3d-visualiseringsprodukter för fastighetsbranschen.
Divide Media, 2011	Diverse industrier	Malmö	Vr-upplevelser åt industriföretag.
Sleepylon Studios, 2006	Programvara	Linköping	3d-optimering, ägs numera av Microsoft.
DVA, 2017	Marknadsföring	Stockholm	Vr- och ar-upplevelser.
Educhem VR, 2016	Utbildning	Göteborg	Vr-upplevelser för kemistudenter.
Enterspace VR, 2015	Idrottsutrustning	Stockholm	Vr-upplevelsecenter i Stockholm. Nyligen köpta av Starbreeze.
Eyemade, 2014	Hårdvara	Kalmar	Vikbart vr-headset. Gjorde succé på Kickstartar.
Faet Travel Games, 2016	Dataspel	Stockholm	Före detta Rovio-chefen Oskar Burmans nya spelbolag.
Gleech, 2014	Programvara	Stockholm	Utvecklar programvara för gästbaserad kontroll i vr-miljöer.
Gobrilla, 2014	Konsult	Stockholm	It-konsulter med ett ben i vr-världen.
Hatrabbit, 2016	Dataspel	Stockholm	Snöbollsslag i vr med spelet Merry Snowballs.
Hoylu, 2016	Produktivitet	Malmö	Utvecklar en plattform för teamwork och produktivitet.
IBRSV, 2015	Hjärtvår, programvara	Stockholm	Innovationshus som utvecklar hårdvara och programvara för interaktiva berättelser.
Ivar, 2016	Media, 360-produktion	Stockholm	Spellet Cloudborn där man både får klättra och hoppa i vr.
Looptown Studios, 2016	Dataspel	Stockholm	Har redan hunnit utveckla flera vr-spel.
Lone Hero Studios, 2016	Dataspel	Skövde	Skapar en vr-miljö för bland annat språkträning.
Ljykyrd, 2016	Utbildning	Växjö	Vr och ar för byga- och tillverkningsindustri.
Magisty, 2010	Bergsbranschen	Malmö	
Nanonote, 2016			



# Pilots

- We are currently running a pilot together with a dedicated team from Umeå University, in the [Bioorganic Chemistry course](#), evaluating and comparing our VR with traditional teaching.
- We have been granted an opportunity to carry out a pilot testing at [Sechenov University](#): “Virtual Reality in Pharmacy Education for Improved Learning”
- We are looking for opportunities for using VR in lower grades - where the main aim is to raise engagement and interest

*Get in contact with us if you're interested in being part of a pilot*

# Technology

**We create VR content on two main platforms**

## **Unity - a multiplatform game-engine**

- We can build and deploy across all major VR platforms. Native support available for a wide range of VR platforms: Google Cardboard, Samsung Gear VR, Oculus Rift, Playstation VR, Steam VR/Vive and Google Daydream.

## **A-frame - a WebVR framework for building with HTML**

- A new exciting platform for building with HTML and javascript. Works on Vive, Rift, Daydream, GearVR, desktop, and Google Cardboards

# The Team



## EduChem VR

founded September 2016 by

### ***Dr. Jonas Boström, CEO***

*Principal Scientist and Associate Professor*

*Drug designer in Big Pharma for +15yrs*

*50+ articles and patents. On [The Power List](#) and recognized as Top-100 of most influential people in Pharma*

### ***Magnus Norrby, CTO***

*Professional programmer in Finance*

*Main developer of open-source Molecular Rift*

*Domain knowledge in virtual reality and cheminformatics*

***We have been working together almost a decade!***

*The EduChem VR board includes senior scientists:  
a professor in Biology and a professor in Chemistry*



# Details

**Full Company Name:** EduChem VR Sweden AB

## Contact

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**Organisation number:** 559075-6002

**Bankgiro:** 5003-1015042

**IBAN:** SE3450000000050033329095

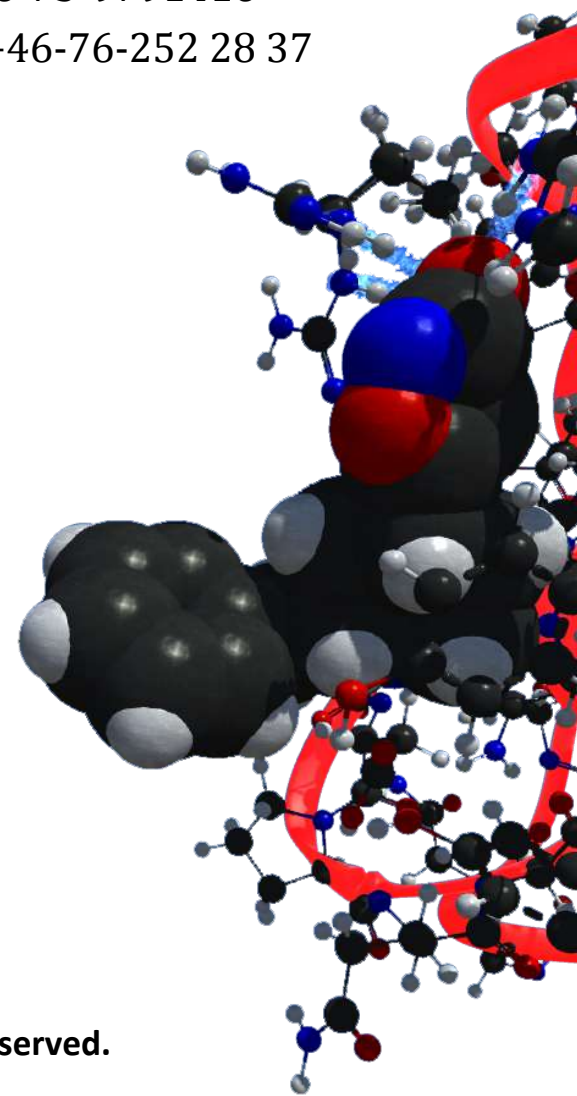
## Social media

webpage: <http://educhem-vr.com/>

Twitter: <https://twitter.com/EduChemVR>

Facebook: <https://www.facebook.com/EduChemVR/>

Instagram: <https://www.instagram.com/educhemvr/>



# Fun Fact

**His Majesty King Carl XVI Gustaf of Sweden, the Crown Princess of Sweden, the Sports Minister of Chile, the Executive Vice President at AstraZeneca and the Head of Business Development at EA Sports have all experienced atoms and molecules using our open-source VR tool.**



**We now shift focus and turn towards tomorrow's leaders:  
the school children across the globe**