

# ***CryoVR: Virtual Reality Hands-on CryoEM Training***

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**Purdue University**

**2020 NYSBC-NCCAT Single-particle short course**

# Increased need for cryoEM training tools

**Increased  
interest in  
cryoEM**



**Increased demand  
for training**

Tuesday, May 15, 2018

NIH funds three national cryo-EM service centers and training for new microscopists

**Virtual Reality  
training tools**



**CryoVR**

# Current demand for Virtual Reality

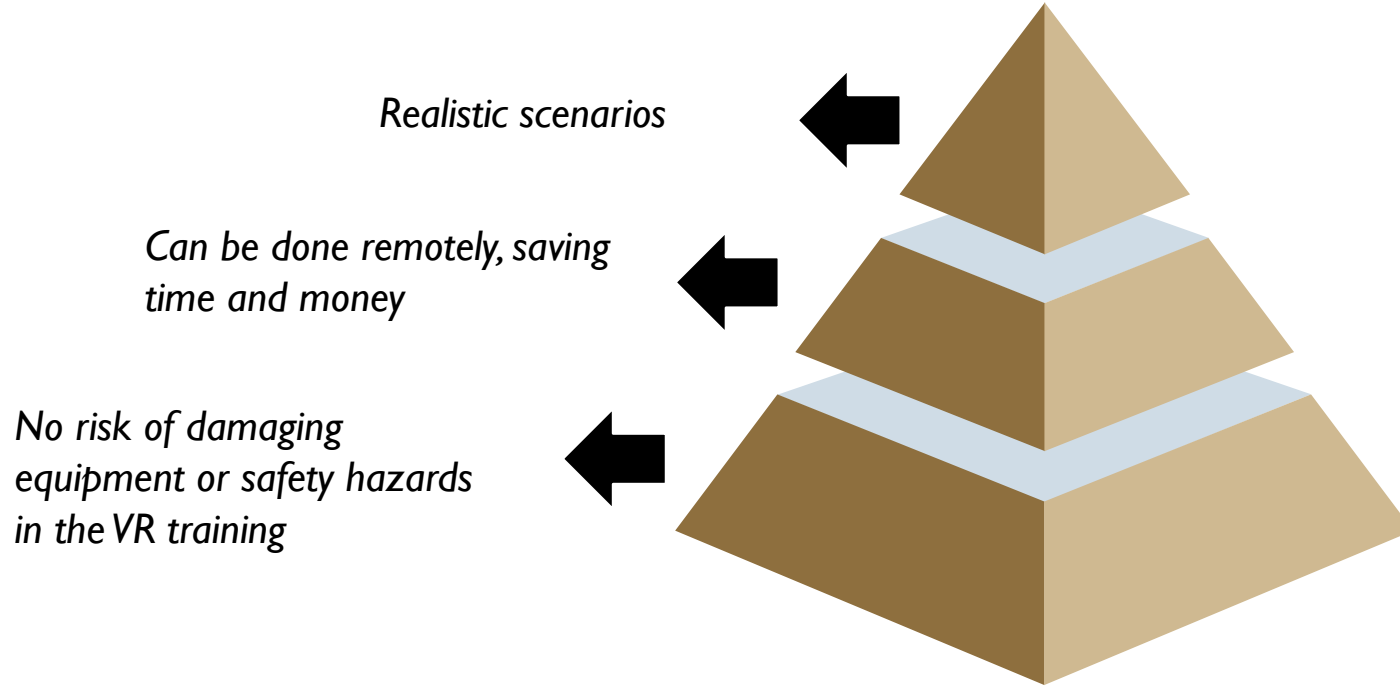


## *Current demand for Virtual Reality*

Beyond simply improving how well learners retain information, VR-based training helps learners when they get it wrong. The ability to track all of a trainee's actions and inputs as he or she moves through a scenario reduces the cost of providing individual feedback and giving tailored feedback

- Deloitte Insights 2018

# Advantages of VR training



# Case: Medical training with VR

Simulates the environment of an operating room

More immersive, hands-on experience than other conventional training methods like video and written instruction.



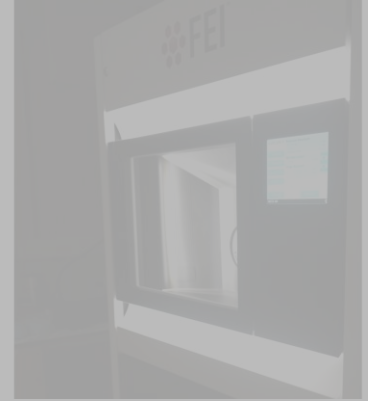
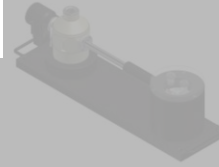
[https://www.youtube.com/watch?time\\_continue=26&v=bqra7wslwCM&feature=emb\\_logo](https://www.youtube.com/watch?time_continue=26&v=bqra7wslwCM&feature=emb_logo)

# CryoEM Workflow

**Sample preparation:**  
plunge-freezing



**Screening:** side entry  
holder microscopes



**Data collection:**  
autoloader and high-end  
microscope operation



# Plunge freezing procedures



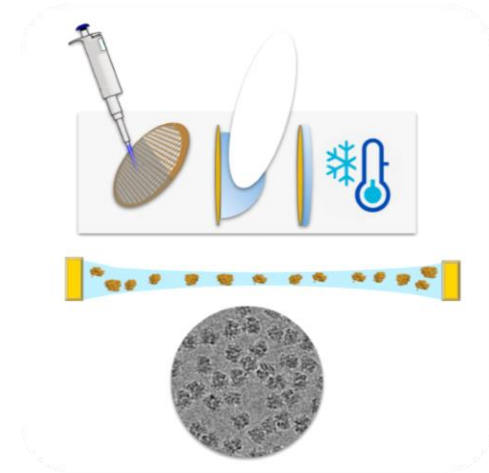
## Preparation

- Ethane
- Humidity chamber



## Secure sample

- Secure on tweezer
- Insert on plunger
- Apply sample

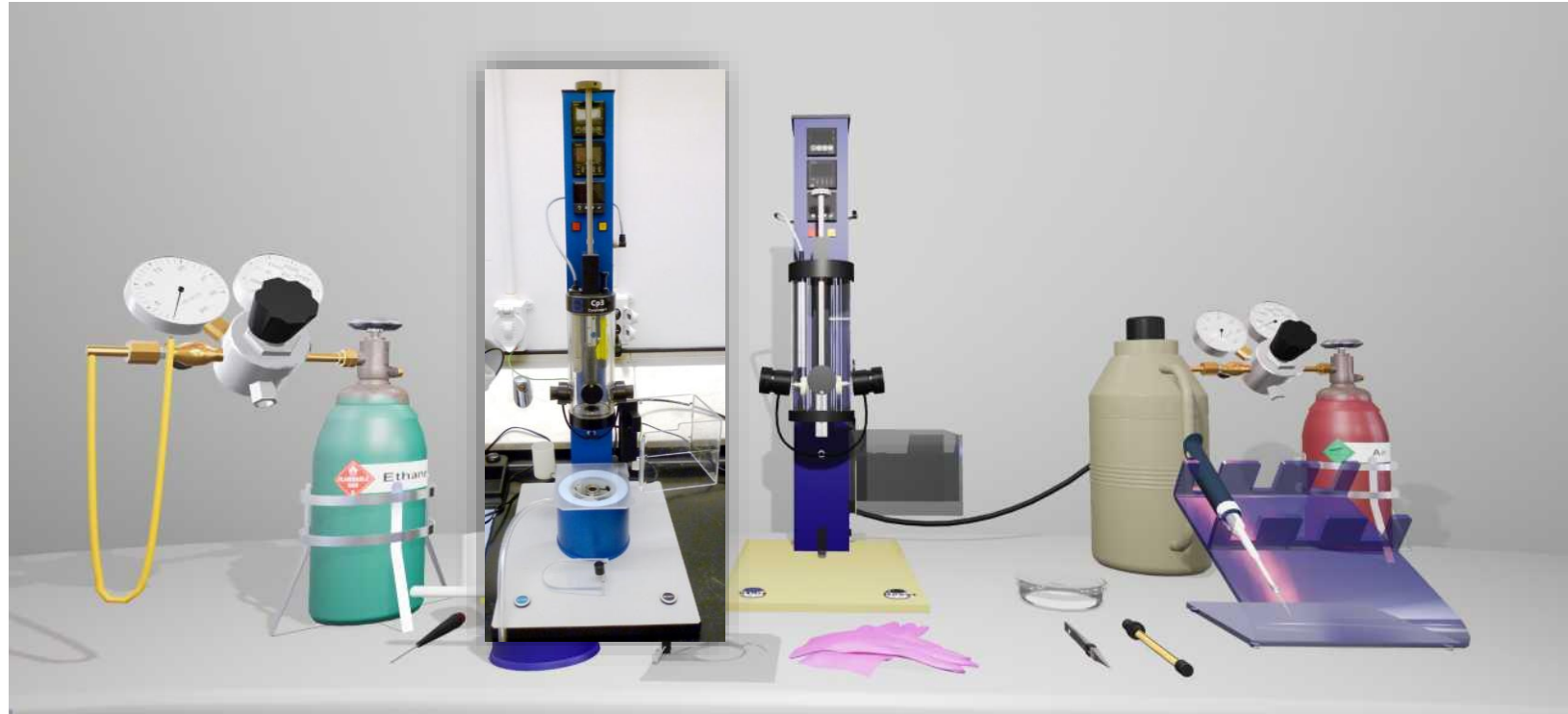


## Snap freezing

- Blot
- Freeze



# Simulating the CP3





## CP3 VR Simulation

[https://www.youtube.com/watch?v=h\\_vjWuToRn0&feature=emb\\_logo](https://www.youtube.com/watch?v=h_vjWuToRn0&feature=emb_logo)

# Simulating the ThermoFisher Vitrobot Mark IV



# *Features in our CryoVR Modules*

**We have made many improvements to our Modules along the way..**

- Voice and text guided instructions
- User Interface guided instructions
- Embedded videos
- Scoring system (in development)
- Different training modes available
- Playback features
- We now incorporate preparation and safety procedures!





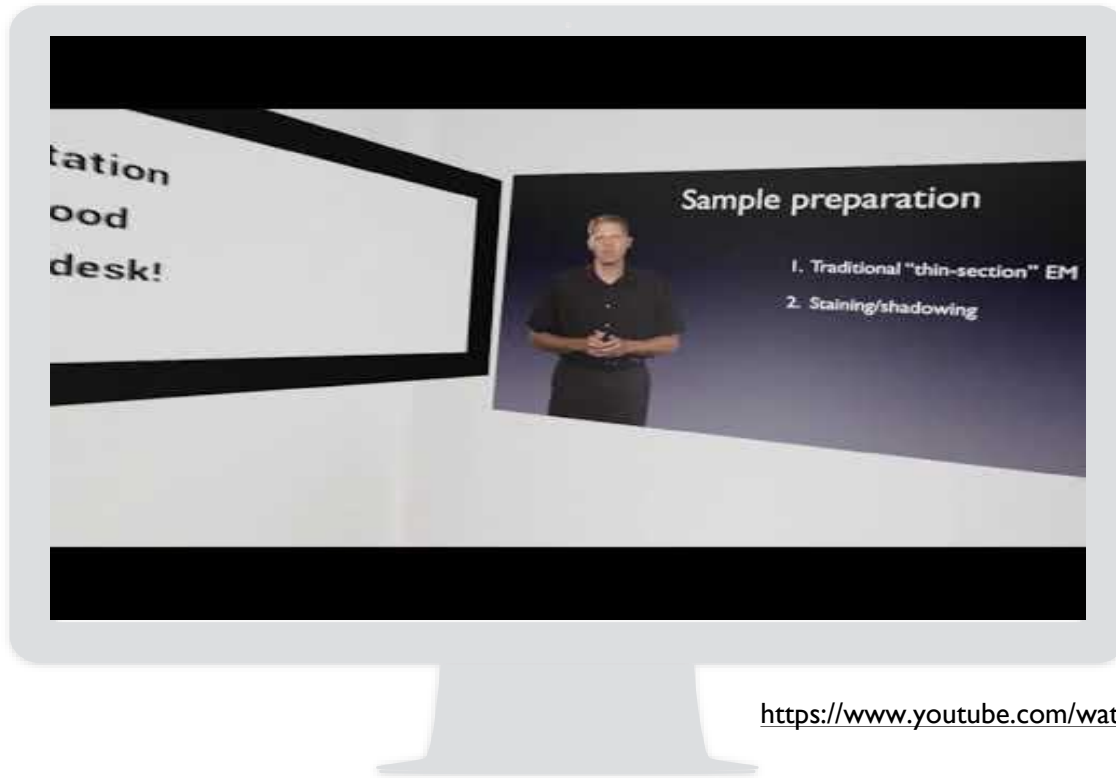
## Demonstration

[https://www.youtube.com/watch?v=BEW0Zp329kl&feature=emb\\_logo](https://www.youtube.com/watch?v=BEW0Zp329kl&feature=emb_logo)



## Playback system

[https://www.youtube.com/watch?v=O0yIcmj68hM&feature=emb\\_logo](https://www.youtube.com/watch?v=O0yIcmj68hM&feature=emb_logo)



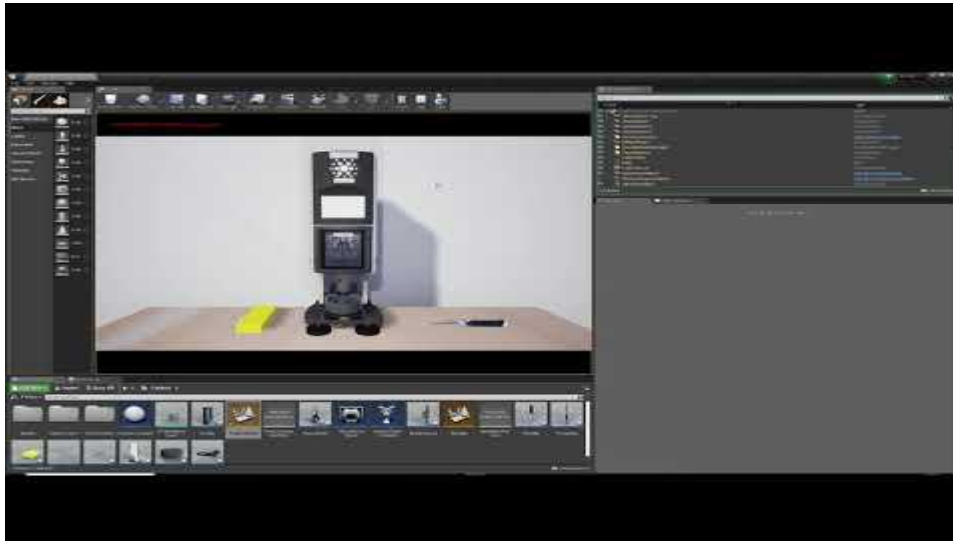
**Newest feature:**  
*embedded  
educational videos*

[https://www.youtube.com/watch?v=KWmFhiEdhFU&feature=emb\\_logo](https://www.youtube.com/watch?v=KWmFhiEdhFU&feature=emb_logo)

# Website Version

**We know some of user do not have VR equipment right now...**

- We designed a Website version to let you experience as much as the VR version can provide.





# Use CryoVR, now!

Purdue CryoVR website link:

<https://www.purdue.edu/cryovr/>

SteamVR download link:

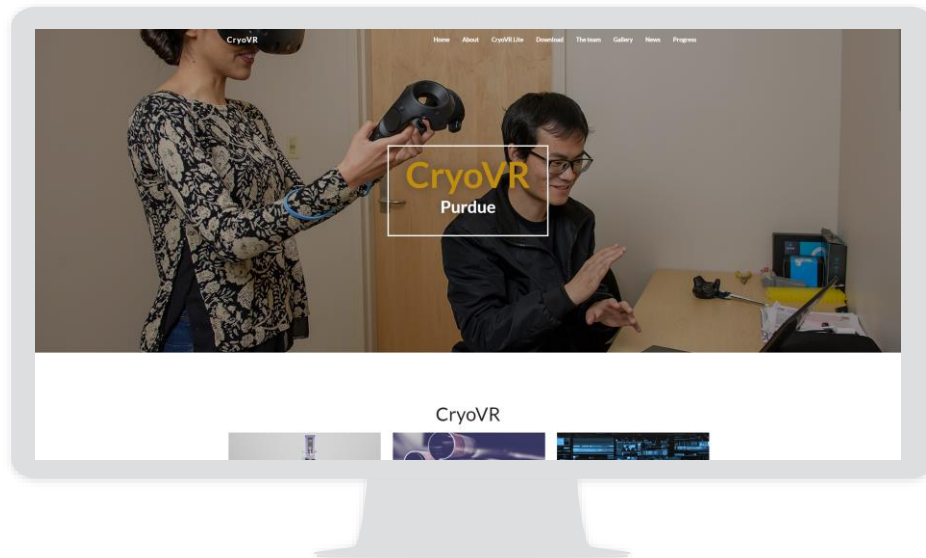
<https://www.steamvr.com/en/>

Recommended Hardware:

Graphic Card: GTX 1070 or higher

RAM: 16GB or higher.

HTC Vive/Vive Pro



# *FUTRUE Direction*

- Grid clipping
- Auto loading Microscope operation
- Side entry holder operation



# Thank you!



National Institutes  
of Health

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***We have a live demo in the  
official CryoVR room***

**Feel free to try it today after the presentation!**