

25 Tech Resources for Neurosurgical Education & Collaboration

Presented by the WFNS Global Neurosurgery Committee



| Collaboration Platforms | | | | |
|---------------------------------------|--|---|---------------------|-------|
| | Learn More | What is it? | Publicly Available? | Free? |
| InterSurgeon | https://intersurgeon.org/ | Website to facilitate collaborations for clinical care, training, and provision of equipment among surgical teams worldwide. | Yes | Yes |
| Ohana One | https://ohanaone.one/ | Facilitates remote surgical training programs with the use of smart glass technology. | Yes | No* |
| UN Global Surgery Learning Hub | https://www.surghub.org/ https://www.globalsurgeryfoundation.org/learn | Collaborative repository for training content | Yes | Yes |
| St. Jude Global | https://global.stjude.org/en-us/ | Supports advancement of pediatric cancer care through comprehensive initiatives in education, capacity building, and research | Yes | Yes |

*Special reduced pricing for the smart glasses, and free glasses for qualifying members through the Surgical Sight program

Broad Neurosurgical E-learning Resources

| | Learn More | What is it? | Publicly Available? | Free? |
|---|---|---|---------------------|-------|
| Rhoton Collection | http://www.rhoton.ineurodb.org | Online resource for neurosurgical anatomy and approaches. | Yes | Yes |
| Neurosurgical Atlas | www.neurosurgicalatlas.com | Open access online platform and mobile app for neurosurgical education, specifically microneurosurgical techniques | Yes | No* |
| CNS Neurosurgery Youtube Channel | https://www.youtube.com/@cnsvideolibrary | Educational mini-lecture videos on a variety of neurosurgical topics | Yes | Yes |
| Neurosurgical.tv | www.neurosurgical.tv OR https://www.youtube.com/@NeurosurgicalTV-LIVE/featured | Live webinars and virtual conferences from neurosurgeons worldwide | Yes | Yes |
| NETS: Neurosurgery Education & Training School | http://aiimsnets.org/neurosurgeryeducation.asp | E-learning platform for free-access to neurosurgery seminars, videos, and forums. NETS also provides in-person neurosurgical skills short term training programs. | Yes | Yes |
| Global Neuro | https://globalneuro.org/EN/resources/free-online-content.html | Online resource for continuing medical education in neurotrauma, complex cranial access, and neurovascular education | Yes | Yes |

* Can be free for LMIC via Research4Life

Operative Videos

| | Learn More | What is it? | Publicly Available? | Free? |
|---|---|--|---------------------|-------|
| 1001 Hernesniemi Videos | https://surgicalneurologyint.com/ | An extensive collection of operative videos for microsurgical techniques by Dr. Juha Hernesniemi | Yes | Yes |
| Seven Series Collection | www.neurosurgicalatlas.com | An extensive collection of operative cerebrovascular cases by Dr. Michael Lawton | Yes | Yes |
| NEUROSURGERY Journal YouTube Channel | https://www.youtube.com/@NeurosurgeryCNS/videos | A mix of supplemental videos from NEUROSURGERY publications and operative videos | Yes | Yes |
| Neurosurgical Focus: Video | https://thejns.org/video/ | Open-access, online journal with high-definition videos of neurosurgical procedures | Yes | Yes |
| AANS Neurosurgery YouTube Channel | https://www.youtube.com/@AANSNeurosurgery | A mix of Rhoton collection anatomy videos and operative videos | Yes | Yes |

Clinical Decision Mobile Apps

| | Learn More | What is it? | Publicly Available? | Free? |
|--|---|---|---------------------|-------|
| NeuroMind | https://www.neuromind.app | #1 app for neurosurgery in the world offering interactive clinical decision support and 120+ clinical classification and grading systems. | Yes | Yes |
| Neurosurgery: What's the Data (Neuro WTD) | https://apps.apple.com/us/app/neurosurgery-whats-the-data/id937329312 | App providing easy access to easy-to-read reviews of essential literature on a wide range of neurosurgical topics | Yes | No |

Simulators: Physical Models & Do-It-Yourself (DIY)

| | Learn More: | What is it? | Publicly Available? | Free? |
|--|--|---|---------------------|-------|
| Lazy Glass Microsurgical Trainer | https://pubmed.ncbi.nlm.nih.gov/30716484/ | Affordable DIY microsurgical simulator set up using a smartphone and pair of reflective prism glasses | Yes | No |
| 3D Printed Models | https://pubmed.ncbi.nlm.nih.gov/26375979/ https://pubmed.ncbi.nlm.nih.gov/33554632/ | Use free open-source software to compare medical imaging into 3D models and print them using commercially available 3D printers | Yes | No |
| Rowena Neurosurgical Training Simulator | https://neurosurgical-training-simulator.com/ | Adult and pediatric physical cranial models for teaching basic neurosurgical techniques | Yes | No |

Simulators: Online & Mobile Apps

| | Learn More | What is it? | Publicly Available? | Free? |
|--|--|---|---------------------|----------|
| Touch Surgery | https://www.touchsurgery.com/simulations | Mobile app providing 200+ simulations from 17 specialties, including 15 neurosurgical procedures. | Yes | Yes |
| UpSurgeOn | www.upsurgeon.com | Virtual & physical technologies designed to improve theoretical knowledge of neuroanatomy and procedures. | Yes | Partial* |
| MILO Posterior Petrosectomy Simulator | https://unityroom.com/games/milo_simulator Password: 3dcd635 | Online interactive 3D neurosurgical simulator for step-wise approach to posterior Petrosectomy | Yes | Yes |

*Website and mobile app are free, physical simulators and augmented reality (AR) tools available for purchase.

Simulators: Virtual & Augmented Reality

| | Learn More: | What is it? | Publicly Available? | Free? |
|-----------------------|---|---|---------------------|-------|
| ImmersiveTouch | https://www.immersivetouch.com/neuro | VR training modules with haptic feedback for a broad range of neurosurgical procedures | Yes | No |
| NeuroVR | https://www.caehealthcare.com/blog/cae-neurovr-revolutionizes-neurosurgical-training-and-patient-safety | VR simulator including a stereovision system, bimanual haptic tool manipulators, and a high-end computer loaded with training tasks for various neurosurgical techniques. | Yes | No |