



Vivek P. Buch, MD

Clinical Assistant Professor, Neurosurgery

CLINICAL OFFICES

- **Stanford Neuroscience Health Center**

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Bio

BIO

Dr. Buch is a neurosurgeon with fellowship training in epilepsy, functional, and minimally invasive neurosurgery. He is a clinical assistant professor in the Department of Neurosurgery of Stanford University School of Medicine.

Dr. Buch focuses his expertise on the open and minimally invasive treatment of epilepsy, brain disorders, spinal injury and disease, and other conditions. For each patient, he develops a personalized care plan that is designed to be both comprehensive and compassionate.

Dr. Buch has conducted extensive research. His interests include restorative network engineering for intellectual and cognitive disability, personalized network-targeting for deep brain stimulation and MRI guided focused ultrasound, and focused ultrasound-mediated delivery mechanisms for gene, stem cell, and molecular therapies. He also is developing technological innovations such as the use of holographic mixed reality and artificial intelligence for visualization and guidance to improve minimally invasive neurosurgical procedures.

He has co-authored articles on his research discoveries in the *Annals of Surgery*, *Frontiers in Neuroscience*, *Epilepsia*, *Stereotactic and Functional Neurosurgery*, *Surgical Innovation*, *Journal of Neurosurgery*, and many other journals. Articles focus on developing novel network control theory applications to human brain functions and new techniques and technologies to enhance neurosurgical effectiveness and patient outcomes.

He is a contributor to the journals *Surgical Innovation* and *Brain Sciences*. He also has co-authored chapters in the books *Neurosurgical Atlas*, *Operative Techniques in Epilepsy Surgery*, *Deep Brain Stimulation*, and *The Encyclopedia of Medical Robotics*.

Dr. Buch has presented the findings of his research at the national conferences of numerous professional associations. Among them are the American Association of Neurological Surgeons, Society for Neuroscience, Congress of Neurological Surgeons, and Society for Imaging Informatics in Medicine. Topics include understanding network mechanisms of cognitive control and advances in the use of augmented reality technology to enhance neurosurgical approaches.

For his clinical, research, and academic achievements. Dr. Buch has earned many honors. He has won awards from the American Association of Neurological Surgeons, American Roentgen Ray Society, Congress of Neurological Surgeons, and National Institutes of Health.

Dr. Buch is a member of the American Association of Neurological Surgeons, Congress of Neurological Surgeons, World Society for Stereotactic and Functional Neurosurgery, American Association of Stereotactic and Functional Neurosurgery, and Alpha Omega Alpha Medical Honor Society.

He holds patents on artificial intelligence systems designed to help guide surgery and on neural control signals for behavioral modification therapy.

CLINICAL FOCUS

- Neurosurgery
- Epilepsy Surgery
- Deep Brain Stimulation
- Laser Interstitial Thermal Therapy
- Focused Ultrasound
- Functional Mapping for Brain Tumors
- Awake Craniotomies
- Movement Disorders
- Facial Pain Syndromes

ACADEMIC APPOINTMENTS

- Clinical Assistant Professor, Neurosurgery

HONORS AND AWARDS

- Nomination for TV Documentary Series, "New Frontiers in Neurosurgery"
- Cover Article Selection, Epilepsia
- Editor's Choice, World Neurosurgery Best Papers
- Pilot Award, Penn Health-Tech Medical Device Competition
- "Rookie of the Year" Influencers of Healthcare Nomination, Philadelphia Inquirer
- Invited Speaker, PennHealthX Medical Innovation Symposium
- Nomination, STAT Wunderkinds
- Resident Award, American Roentgen Ray Society
- Podium Presentation Selections, American Association of Neurological Surgeons
- Editor's Choice: Best Papers, Journal of Neurosurgery Peds
- Award, Who's Who in America
- National Innovation Pre-Accelerator Advancement Selection, FedTech
- National Innovation Cohort Selection, Best Team, Lead Inventor, FedTech
- Podium Presentation Selection Functional Scientific Session, American Association of Neurological Surgeons
- Annual Meeting Best Oral Presentation, Pennsylvania Neurosurgical State Society
- Alpha Omega Alpha Selection, Medical National Honor Society
- Sigma Xi Research Award -- Most Outstanding Student Researcher in MD Class of 2013, The Warren Alpert Medical School of Brown University (2013)
- Dr. Stanley M. Aronson Award -- Most Outstanding Student in Neurosciences in MD Class of 2013, The Warren Alpert Medical School of Brown University (2013)

- National Institutes of Health Research Scholar Selection, Howard Hughes Medical Institute
- 2nd Place Overall Abstract Award, North American Neuromodulation Society
- Podium Presentation Selection, American Society for Stereotactic and Functional Neurosurgery
- Best Poster Award, Movement Disorders, American Society for Stereotactic and Functional Neurosurgery
- New Investigator Award Finalist, Rhode Island Hospital Research Celebration
- Presidential Scholar, United States Department of Education

PROFESSIONAL EDUCATION

- Instructor, Stanford University , Epilepsy, Restorative, and Functional Neurosurgery, Department of Neurosurgery (2021)
- Fellowship, University of Pennsylvania , Epilepsy and Minimally Invasive Neurosurgery, Department of Neurosurgery (2020)
- Residency: University of Pennsylvania Dept of GME (2020) PA
- Medical Education: Warren Alpert Medical School Brown University (2013) RI
- Research Scholar, Howard Hughes Medical Institute - National Institutes of Health , Complex Network Science (2012)

Teaching

STANFORD ADVISEES

Postdoctoral Research Mentor

Anjali Datta

Publications

PUBLICATIONS

- **Network Brain-Computer Interface (nBCI): An Alternative Approach for Cognitive Prosthetics** *FRONTIERS IN NEUROSCIENCE*
Buch, V. P., Richardson, A. G., Brandon, C., Stiso, J., Khattak, M. N., Bassett, D. S., Lucas, T. H.
2018; 12: 790
- **Do-It-Yourself Augmented Reality Heads-Up Display (DIY AR-HUD): A Technical Note.** *International journal of spine surgery*
Yoon, J. W., Spadola, M., Blue, R., Saylany, A., Sharma, N., Ahmad, H. S., Buch, V., Madhavan, K., Chen, H. I., Steinmetz, M. P., Welch, W. C., Malhotra, N. R.
2021
- **Focused ultrasound for functional neurosurgery.** *Journal of neuro-oncology*
Lev-Tov, L., Barbosa, D. A., Ghanouni, P., Halpern, C. H., Buch, V. P.
2021
- **Theta Synchrony Is Increased near Neural Populations That Are Active When Initiating Instructed Movement** *ENEURO*
Ramayya, A. G., Yang, A., Buch, V. P., Burke, J. F., Richardson, A. G., Brandon, C., Stein, J. M., Davis, K. A., Chen, H., Proekt, A., Kelz, M. B., Litt, B., Gold, et al
2021; 8 (1)
- **Development of an Intraoperative Pipeline for Holographic Mixed Reality Visualization During Spinal Fusion Surgery** *SURGICAL INNOVATION*
Buch, V. P., Mensah-Brown, K. G., Germi, J. W., Park, B. J., Madsen, P. J., Borja, A. J., Haldar, D., Basenfelder, P., Yoon, J. W., Schuster, J. M., Chen, H. I.
2020: 1553350620984339
- **Aventricular hemispherotomy: technical note** *JOURNAL OF NEUROSURGERY-PEDIATRICS*
Brimley, C., Buch, V. P., Pisapia, J. M., Kennedy, B. C.
2020; 26 (6): 642-647
- **Focused Ultrasound Thalamotomy with Dentato-Rubro-Thalamic Tractography in Patients with Spinal Cord Stimulators and Cardiac Pacemakers** *STEREOTACTIC AND FUNCTIONAL NEUROSURGERY*
Buch, V. P., McShane, B. J., Beatson, N., Yang, A., Blanke, A., Tilden, D., Korn, M., Chaibainou, H., Ramayya, A., Wombacher, K., Maier, S., Marshlian, T., Wolf, et al

2020; 98 (4): 263-269

- **Detailed Analysis of Hydrocephalus and Hindbrain Herniation After Prenatal and Postnatal Myelomeningocele Closure: Report From a Single Institution** *NEUROSURGERY*
Flanders, T. M., Heuer, G. G., Madsen, P. J., Buch, V. P., Mackell, C. M., Alexander, E. E., Moldenhauer, J. S., Zarnow, D. M., Flake, A. W., Adzick, N.
2020; 86 (5): 637-645
- **Thalamic Deep Brain Stimulation for Essential Tremor: Relation of the Dentatorubrothalamic Tract with Stimulation Parameters** *WORLD NEUROSURGERY*
Yang, A., Buch, V. P., Heman-Ackah, S. M., Ramayya, A. G., Hitti, F. L., Beatson, N., Chaibainou, H., Yates, M., Wang, S., Verma, R., Wolf, R. L., Baltuch, G. H.
2020; 137: E89-E97
- **Near-Infrared Fluorescence with Second-Window Indocyanine Green as an Adjunct to Localize the Pituitary Stalk During Skull Base Surgery** *WORLD NEUROSURGERY*
Cho, S. S., Buch, V. P., Teng, C. W., De Ravin, E., Lee, J. K.
2020; 136: 326
- **F-18-Fluciclovine PET to distinguish treatment-related effects from disease progression in recurrent glioblastoma: PET fusion with MRI guides neurosurgical sampling** *NEURO-ONCOLOGY PRACTICE*
Henderson, F., Brem, S., O'Rourke, D. M., Nasrallah, M., Buch, V. P., Young, A. J., Doot, R. K., Pantel, A., Desai, A., Bagley, S. J., Nabavizadeh, S.
2020; 7 (2): 152-157
- **How technology is driving the landscape of epilepsy surgery** *EPILEPSIA*
Dorfer, C., Rydenhag, B., Baltuch, G., Buch, V., Blount, J., Bollo, R., Gerrard, J., Nilsson, D., Roessler, K., Rutka, J., Sharan, A., Spencer, D., Cukiert, et al
2020; 61 (5): 841-855
- **Second Window Indocyanine Green (SWIG) Near Infrared Fluorescent Transventricular Biopsy of Pineal Tumor** *WORLD NEUROSURGERY*
Cho, A., Cho, S. S., Buch, V. P., Buch, L. Y., Lee, J. K.
2020; 134: 196-200
- **Refocusing neurosurgical resident education amidst the COVID-19 crisis: A mental imagery-based transfer learning approach for virtual teaching of operative fundamentals.**
Sinha, S., Howard, S. D., Buch, V. P.
Annals of Surgical Education.
2020 3
- **Policies Restricting Overlapping Surgeries Negatively Impact Access to Care, Clinical Efficiency and Hospital Revenue: A Forecasting Model for Surgical Scheduling.** *Annals of surgery*
Brandon, C., Ghenbot, Y., Buch, V., Contreras-Hernandez, E., Tooker, J., Dimentberg, R., Richardson, A. G., Lucas, T. H.
2020
- **Endoscopic endonasal resection versus open surgery for pediatric craniopharyngioma: comparison of outcomes and complications** *JOURNAL OF NEUROSURGERY-PEDIATRICS*
Madsen, P. J., Buch, V. P., Douglas, J. E., Parasher, A. K., Lerner, D. K., Alexander, E., Workman, A. D., Palmer, J. N., Lang, S., Kennedy, B. C., Vossough, A., Adappa, N. D., Storm, et al
2019; 24 (3): 236-245
- **Stereoencephalography in Pediatric Epilepsy Surgery** *JOURNAL OF KOREAN NEUROSURGICAL SOCIETY*
Tomlinson, S. B., Buch, V. P., Armstrong, D., Kennedy, B. C.
2019; 62 (3): 302-312
- **An estimation of global volume of surgically treatable epilepsy based on a systematic review and meta-analysis of epilepsy** *JOURNAL OF NEUROSURGERY*
Vaughan, K. A., Ramos, C., Buch, V. P., Mekary, R. A., Amundson, J. R., Shah, M., Rattani, A., Dewan, M. C., Park, K. B.
2019; 130 (4): 1127-1141
- **Factors Predicting Ventriculostomy Revision at a Large Academic Medical Center** *WORLD NEUROSURGERY*
Ramayya, A. G., Glauser, G., Meshane, B., Branche, M., Sinha, S., Kvint, S., Buch, V., Abdullah, K. G., Kung, D., Chen, H., Malhotra, N. R., Ozturk, A.
2019; 123: E509-E514

- **Novel Inter-Trial Resting State Network Analysis can Reliably Predict Learning and Performance of a Cognitive Reaction Time Task**
Buch, V. P., Cameron, B., Archer, R., Stiso, J., Ramayya, A., Yang, A., Richardson, A., Bassett, D., Lucas, T.
JOURNAL OF NEUROSURGERY.
2019
- **Increased dynamic modularity of the fronto-temporo-limbic network precedes enhanced task performance** *Journal of Neurosurgery*
Buch, V., Brandon, C., Khambhati, A., Richardson, A., Bassett, D., Lucas, T.
2018
- **Rotational vertebral insufficiency due to compression of a persistent first intersegmental vertebral artery variant: case report** *JOURNAL OF NEUROSURGERY-SPINE*
Buch, V. P., Madsen, P. J., Vaughan, K. A., Koch, P. F., Kung, D. K., Ozturk, A. K.
2017; 26 (2): 199-202
- **Resident simulation training in endoscopic endonasal surgery utilizing haptic feedback technology** *JOURNAL OF CLINICAL NEUROSCIENCE*
Thawani, J. P., Ramayya, A. G., Abdullah, K. G., Hudgins, E., Vaughan, K., Piazza, M., Madsen, P. J., Buch, V., Grady, M.
2016; 34: 112-116
- **Lumbar decompression for dorsiflexion palsy** *JOURNAL OF THE NEUROLOGICAL SCIENCES*
Buch, V. P., Ozturk, A. K.
2016; 362: 64-65
- **210 Human Sensorimotor Electroencephalography: Spectral Dynamics and Network Connectivity During a Simple Motor Task** *Neurosurgery*
Buch, V. P., Burke, J. F., Ramayya, A. G., Brandon, C., Hudgins, E., Richardson, A., Lucas, T. H.
2016; 63 (CN_suppl_1)
- **Varicella zoster-induced magnetic resonance imaging abnormalities of the trigeminal nucleus** *JOURNAL OF THE NEUROLOGICAL SCIENCES*
Douglas, J. E., Buch, V. P., Mamourian, A. C.
2015; 359 (1-2): 57-58