Stanford

Matthew Petrucci

Research Engineer

Bioengineering

Bio

BIO

Matt is the Scientific Program Manager for the Mobilize and Restore Centers at Stanford University. He is interested in developing digital health tools that optimize human mobility and performance. His previous research has focused on cross-sectional, longitudinal, translational, and feasibility studies in people with Parkinson's disease, people with multiple sclerosis, and firefighters. These studies included evaluating objective biomarkers of disease or performance, optimizing and evaluating novel treatments and interventions, developing real-time closed-loop algorithms, and clinical trials. He helps run the various scientific outreach and training programs of the Mobilize and Restore Centers.

ACADEMIC APPOINTMENTS

- Research Engineer, Bioengineering

PROFESSIONAL EDUCATION

- PhD, University of Illinois at Urbana-Champaign , Neuroscience (2016)
- MS, University of Illinois at Urbana-Champaign , Mechanical Engineering (2016)
- BS/BA, University of San Diego , Mechanical Engineering (2007)

Publications

PUBLICATIONS

- **Surface electromyographic profiles during gait initiation in people with Parkinson's disease: The effects of external sensory cueing** *JOURNAL OF PARKINSONS DISEASE*
  Perg, L. A., Lu, C., Petrucci, M. N., Chung, J., Tuite, P. J., MacKinnon, C. D., Amundsen-Huffmaster, S. L.
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- **Beta burst-driven adaptive deep brain stimulation for gait impairment and freezing of gait in Parkinson's disease.** *Brain communications*
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- **USING OPENCAP TO ASSESS SINGLE-LEG SQUATS IN A COMBINED COHORT WITH ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION RECIPIENTS AND HEALTHY CONTROLS**
  He, J., Zhang, I., Petrucci, M., Hicks, J., Chu, C. R.
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- **The digital signature of emergent tremor in Parkinson's disease.** *NPJ Parkinson's disease*
  Gala, A. S., Wilkins, K. B., Petrucci, M. N., Kehnemouyi, Y. M., Velisar, A., Trager, M. H., Bronte-Stewart, H. M.
  2024; 10 (1): 147

- **Kinematic adaptive deep brain stimulation for gait impairment and freezing of gait in Parkinson's disease.** *Brain stimulation*
  Melbourne, J. A., Kehnemouyi, Y. M., O'Day, J. J., Wilkins, K. B., Gala, A. S., Petrucci, M. N., Lambert, E. F., Dorris, H., Diep, C., Herron, J. A., Bronte-Stewart, H. M.
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- **The Sequence Effect Worsens Over Time in Parkinson's Disease and Responds to Open and Closed-Loop Subthalamic Nucleus Deep Brain Stimulation.** *Journal of Parkinson's disease*
  Kehnemouyi, Y. M., Petrucci, M. N., Wilkins, K. B., Melbourne, J. A., Bronte-Stewart, H. M.
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- **Bradykinesia and its progression are related to inter-hemispheric beta coherence.** *Annals of neurology*
  Wilkins, K. B., Kehnemouyi, Y. M., Petrucci, M. N., Anderson, R. W., Parker, J. E., Trager, M. H., Neuville, R. S., Koop, M. M., Velisar, A., Blumenfeld, Z., Quinn, E. J., Bronte-Stewart, H. M.
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- **Quantitative Digitography Measures Motor Symptoms and Disease Progression in Parkinson's Disease.** *Journal of Parkinson's disease*
  Wilkins, K. B., Petrucci, M. N., Kehnemouyi, Y., Velisar, A., Han, K., Orthlieb, G., Trager, M. H., O'Day, J. J., Aditham, S., Bronte-Stewart, H.
  2022

- **Proceedings of the Ninth Annual Deep Brain Stimulation Think Tank: Advances in Cutting Edge Technologies, Artificial Intelligence, Neuromodulation, Neuroethics, Pain, Interventional Psychiatry, Epilepsy, and Traumatic Brain Injury.** *Frontiers in human neuroscience*
  Wong, J. K., Deuschl, G., Wolke, R., Bergman, H., Muthuraman, M., Groppa, S., Sheth, S. A., Bronte-Stewart, H. M., Wilkins, K. B., Petrucci, M. N., Lambert, E., Kehnemouyi, Y., Starr, et al
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- **Concurrent stimulation and sensing in bi-directional brain interfaces: a multi-site translational experience.** *Journal of neural engineering*
  Ansó, J., Benjaber, M., Parks, B., Parker, S., Oehrn, C. R., Petrucci, M., Gilron, R., Little, S., Wilt, R., Bronte-Stewart, H., Gunduz, A., Borton, D., Starr, et al
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- **Can People with Parkinson's Disease Self-Trigger Gait Initiation? A Comparison of Cueing Strategies** *JOURNAL OF PARKINSONS DISEASE*
  Petrucci, M. N., Amundsen-Huffmaster, S., Chung, J., Hsiao-Wecksler, E. T., MacKinnon, C. D.
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- **Lack of progression of beta dynamics after long-term subthalamic neurostimulation.** *Annals of clinical and translational neurology*
  Anderson, R. W., Wilkins, K. B., Parker, J. E., Petrucci, M. N., Kehnemouyi, Y., Neuville, R. S., Cassini, D., Trager, M. H., Koop, M. M., Velisar, A., Blumenfeld, Z., Quinn, E. J., Henderson, et al
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- **Ramp Rate Evaluation and Configuration for Safe and Tolerable Closed-Loop Deep Brain Stimulation.** *International IEEE/EMBS Conference on Neural Engineering : [proceedings]. International IEEE EMBS Conference on Neural Engineering*
  Petrucci, M. N., Wilkins, K. B., Orthlieb, G. C., Kehnemouyi, Y. M., O'Day, J. J., Herron, J. A., Bronte-Stewart, H. M.
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- **Differential Effects of Pathological Beta Burst Dynamics Between Parkinson's Disease Phenotypes Across Different Movements.** *Frontiers in neuroscience*
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- **Perspective: Evolution of Control Variables and Policies for Closed-Loop Deep Brain Stimulation for Parkinson's Disease Using Bidirectional Deep-Brain-Computer Interfaces** *FRONTIERS IN HUMAN NEUROSCIENCE*
  Bronte-Stewart, H. M., Petrucci, M. N., O'Day, J. J., Afzal, M., Parker, J. E., Kehnemouyi, Y. M., Wilkins, K. B., Orthlieb, G. C., Hoffman, S. L.
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- **Perspective: Evolution of Control Variables and Policies for Closed-Loop Deep Brain Stimulation for Parkinson's Disease Using Bidirectional Deep-Brain-Computer Interfaces.** *Frontiers in human neuroscience*
  Bronte-Stewart, H. M., Petrucci, M. N., O'Day, J. J., Afzal, M. F., Parker, J. E., Kehnemouyi, Y. M., Wilkins, K. B., Orthlieb, G. C., Hoffman, S. L.

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- **A Closed-loop Deep Brain Stimulation Approach for Mitigating Burst Durations in People with Parkinson's Disease.** *Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Annual International Conference*
  Petrucci, M. N., Anderson, R. W., O'Day, J. J., Kehnemouyi, Y. M., Herron, J. A., Bronte-Stewart, H. M.
  2020; 2020: 3617–20

- **Demonstration of Kinematic-Based Closed-loop Deep Brain Stimulation for Mitigating Freezing of Gait in People with Parkinson's Disease.** *Annual International Conference of the IEEE Engineering in Medicine and Biology Society. IEEE Engineering in Medicine and Biology Society. Annual International Conference*
  O'Day, J. J., Kehnemouyi, Y. M., Petrucci, M. N., Anderson, R. W., Herron, J. A., Bronte-Stewart, H. M.
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- **REM sleep without atonia is associated with increased rigidity in patients with mild to moderate Parkinson's disease.** *Clinical neurophysiology : official journal of the International Federation of Clinical Neurophysiology*
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- **Neural Closed loop deep brain stimulation for freezing of Gait.** *Brain stimulation*
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- **A Neuromechanical Model of Reduced Dorsiflexor Torque During the Anticipatory Postural Adjustments of Gait Initiation** *IEEE TRANSACTIONS ON NEURAL SYSTEMS AND REHABILITATION ENGINEERING*
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