Thomas D. Hosman

Curriculum Vitae November 2022

Contact

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Education

M.S. Electrical and Computer Engineering, University of Oklahoma, 2012
Thesis title: *Non-Invasive Ultrasonic Communication Methods and Analysis for Stacked and Individual Shipping Containers*

B.S. Electrical Engineering, University of Oklahoma, 2009

Employment

2020-Present Senior Research Engineer, School of Engineering, Brown University, Providence, RI

2015-2019 Research Engineer, School of Engineering, Brown University. Providence, RI

2012-2015 Systems/Firmware Engineer II, Seagate Technologies, Longmont, CO

Patents

2021 Hochberg LR, Singer-Clark T, Goss R, Kapitonava A, Simeral JD, Hosman T. *Brain Computer Interface (BCI) System That Can Be Implemented On Multiple Devices*. United States Provisional Application 63/274,133.

2016 Moon JE, Murphy RD, Habinsky M, Hitch DA, Hosman T. *Direct hinting for a memory device*. United States #9,436,408.

2016 Antonio J, Yeary M, and Hosman T. *Ultrasonic communication system for communication through RF-impervious enclosures and abutted structures*. United States #9,361,877.

2015 LaPanse MA, Baum JM, Keeler SM, Baum ME, Hosman T, Murphy RD *Cache data value tracking*. United States #9,213,646.

Programming Tools

MATLAB
Python, Pytorch, Tensorflow
Slurm (high-performance cluster)
C, C++, C#, VHDL, Verilog

Talks

2021 November "Validity and Interpretation of Dimensionality Reduction Methods" – *Carney Methods Meetup*, Carney Institute for Brain Science, Brown Univ.

2019 March "Simulated LSTM Kinematic Decoding across Three Individuals" – *Ignite presentation* IEEE NER'19 Conference

Publications

[1] Rubin DB, **Hosman T**, Kelemen JN, Kapitonava, A, Willett FR, Coughlin BF, Halgren E, Kimchi EY, Williams ZM, Simeral JD, Hochberg LR, & Cash, SS (2022). Learned Motor Patterns Are Replayed in Human Motor Cortex during Sleep. *Journal of Neuroscience*, *42*(25), 5007–5020.

[2] Simeral JD, **Hosman T**, Saab J, Flesher SN, Vilela M, Franco B, Kelemen JN, Brandman DM, Ciancibello JG, Rezaii PG, Eskandar EN, Rosler DM, Shenoy KV, Henderson JM, Nurmikko AV, & Hochberg LR. (2021). Home use of a percutaneous wireless intracortical brain-computer interface by individuals with tetraplegia. *IEEE Transactions on Biomedical Engineering*, *68*(7), 2313–2325.

[3] **Hosman T***, Hynes JB*, Saab J*, Wilcoxen, KG, Buchbinder BR, Schmansky N, Cash SS, Eskandar EN, Simeral, JD, Franco B, Kelemen J, Vargas-Irwin CE, & Hochberg LR. (2021). Auditory cues reveal intended movement information in middle frontal gyrus neuronal ensemble activity of a person with tetraplegia. *Scientific Reports 2021 11:1*, *11*(1), 1–17. *these authors contributed equally

[4] **Hosman T**, Vilela M, Milstein D, Kelemen JN, Brandman DM, Hochberg LR, & Simeral JD. (2019). BCI decoder performance comparison of an LSTM recurrent neural network and a Kalman filter in retrospective simulation. *International IEEE/EMBS Conference on Neural Engineering, NER*, *2019-March*, 1066–1071.

[5] Brandman D, **Hosman T**, Saab J, Burkhart MC, Shanahan BE, Ciancibello JG, Sarma AA, Milstein DJ, Vargas-Irwin CE, Franco B, Kelemen J, Blabe C, Murphy B, Young DR, Willet F, Pandarinath C, Stavisky SD, Kirsch RF, Walter BL, Ajiboye B, Cash SS, Eskandar EN, Miller J, Sweet J, Shenoy KV, Henderson JM, Jarosiewicz B, Harrison M, Simeral J, Hochberg L. (2018). Rapid calibration of an intracortical brain–computer interface for people with tetraplegia. *Journal of Neural Engineering*, *15*(2), 026007

Abstracts / Posters

[1] **Hosman T**, Vargas-Irwin CE, Thengone DJ, Kapitonava A, Hochberg LR, Simeral JD. *Ten finger decoding from left precentral gyrus of a person with tetraplegia using an intracortical BCI*. Program No. 475.02. 2022 Neuroscience Meeting Planner. San Diego, CA: *Society for Neuroscience*, 2022. Online.

[2] Vargas-Irwin CE, **Hosman T**, Gusman J, Pun T, Singer-Clark T, Kapitonava A, Shah NP, Kamdar F, Hochberg LR. *Single hemisphere encoding of 48 right and left hand gestures in human precentral gyrus*. Program No. 102.03. 2022 Neuroscience Meeting Planner. San Diego, CA: *Society for Neuroscience*, 2022. Online.

[3] Pun T, **Hosman T**, Kapitonava A, Vargas-Irwin CE, Simeral JD, Harrison MT, Hochberg LR. *Tracking Nonstationarity in Multi-Day Intracortical Neural Recordings During iBCI Cursor Control by a Person with Tetraplegia*. Program No. 475.03. 2022 Neuroscience Meeting Planner. San Diego, CA: *Society for Neuroscience*, 2022. Online.

[4] Gross-Lewis R, Singer-Clark T, **Hosman T**, Crawford R, Kapitonava A, Simeral JD, Hochberg LR. *Engaging individuals with tetraplegia in the user-centered design of a home intracortical BCI*. Program No. 475.08. 2022 Neuroscience Meeting Planner. San Diego, CA: *Society for Neuroscience*, 2022. Online.

[5] **Hosman T**, Vargas-Irwin CE, Kapitonava A, Hochberg LR, Simeral JD. *Interaction of effector and direction encoding in motor cortex of a person with tetraplegia during a bimanual task*. Program No. 556.13. 2021 Neuroscience Meeting Planner. Chicago, IL: *Society for Neuroscience*, 2021. Online.

[6] Singer-Clark T, Gross R, **Hosman T**, Kapitonava A, Simeral JD, Hochberg LR. *Enabling a high quality user experience during independent home use of an iBCI by an individual with tetraplegia*. Program No. 555.12. 2021 Neuroscience Meeting Planner. Chicago, IL: *Society for Neuroscience*, 2021. Online.

[7] Gusman JT, De Lucena DS, Vargas-Irwin CE, Kapitonava A, Wagner DA, **Hosman T**, Walsh C, Simeral JD, Hochberg LR. *Influence of sensory feedback signals on motor cortex during hand movement using a soft robotic glove*. Program No. 556.12. 2021 Neuroscience Meeting Planner. Chicago, IL: *Society for Neuroscience*, 2021. Online.

[8] Rubin, D, **Hosman T**, Keleman J, Coughlin B, Kimchi E, Simeral J, Hochberg L, Cash S. (2021). Learned motor patterns replayed in human motor cortex during sleep. Cosyne Abstracts 2021.

[9] Wilcoxen KG, **Hosman T**, Hynes JB, Saab, J, Buchbinder BR, Shimansky N, Cash SS, Eskandar EN, Simeral JD, Franco B, Keleman J, Vargas-Irwin CE, Hochberg LR. *Human middle frontal gyrus exhibits activity related to both eye movements and intended hand movements*. Program No. 315.03. 2019 Neuroscience Meeting Planner. Chicago, IL: *Society for Neuroscience*, 2019. Online.

[10] Thengone DJ, **Hosman T**, Simeral JD, Hochberg LR. *Development of a novel auditory-reliant intracortical brain computer interface for effector control and communication in patients with tetraplegia.* Program No. 406.18. 2019 Neuroscience Meeting Planner. Chicago, IL: *Society for Neuroscience*, 2019. Online.

[11] Brandman DM, Saab J, **Hosman T,** Franco B, Kelemen J, Nurmikko AV, Borton DA, Hochberg LR, Simeral JD. *Comparing the bitrate communication performance of a wired vs. wireless intracortical brain computer interface in a person with tetraplegia*. Program No. 505. 2018 ASSFN Biennial Meeting, Denver, CO: *American Society for Stereotactic and Functional Neurosurgery (ASSFN),* 2018.

[12] Brandman DM, **Hosman T**, Saab J, Kelemen J, Franco B, Hochberg LR, Simeral JD. *Retrospective analysis of the effects of nonstationarities on decoding performance in people using an intracortical brain computer interface*. Program No. 115622. *7th International Brain Computer Interface Conference*, Asilomar, CA. 2018.

[13] Thengone DJ, **Hosman T**, Saab J, Simeral JD, Hochberg LR. *Tracking longitudinal changes in sleep features in an intracortical brain-computer interface user with tetraplegia*. Program No. 590.07. 2018 Neuroscience Meeting Planner. San Diego, CA: *Society for Neuroscience*, 2018. Online.

[14] Brea JR, Shanahan BE, Saab J, **Hosman T**, Simeral JD, Hochberg LR. *Approaching a 24/7 at home BrainGate BCI system through design thinking, user-centered design and agile development*. Program No. 672.05. 2018 Neuroscience Meeting Planner. San Diego, CA: *Society for Neuroscience*, 2018. Online.

[15] Wilcoxen KG, Vargas-Irwin CE, Hynes JB, **Hosman T**, Saab, J, Franco B, Keleman J, Eskandar EN, Donoghue JP, Hochberg LR. *Single unit activity in middle frontal gyrus of a person with tetraplegia reveals sensory specific modulation*. Program No. 590.08. 2018 Neuroscience Meeting Planner. San Diego, CA: *Society for Neuroscience*, 2018. Online.

[16] **Hosman T**, Vilela M, Saab J, Heelan CD, Brandman D, Simeral JD, Hochberg LR. *Comparison of decoding accuracy: retrospectively trained recurrent neural network and Kalman vs the same-day Kalman decoder*. Program No. 672.07. 2018 Neuroscience Meeting Planner. San Diego, CA: *Society for Neuroscience*, 2018. Online.

[17] Chavakula V, Fasoli SE, Brandman DM, Saab J, **Hosman T**, Franco B, Simeral JD, Donoghue JP, Hochberg LR. *Contextual differences in motor cortical neural firing patterns when controlling multiple devices using an intracortical brain-computer interface (iBCI)*. 85th Annual Scientific Meeting of the American Association of Neurological Surgeons (AANS). 612. 2017.

[18] Fasoli S, Chavakula V, Brandman D, Vargas-Irwin C, Saab J, **Hosman T**, Franco B, Simeral J, Donoghue J, Hochberg L. *Intracortical brain-computer interface (iBCI) to control multiple end effectors: effects of context*. Abstract ID 305174. ACRM 94th Annual Conference, Progress in Rehabilitation Medicine. Atlanta, GA: *American Congress of Rehabilitation Medicine*, 2017.

[19] Lin D, Vilela M, Brandman D, **Hosman T**, Saab J, Sarma A, Simeral J, Truccolo W, Hochberg L. *Investigation of the neural dynamics of human motor learning using an intracortical brain computer interface*. Abstract ID 354217. ACRM 94th Annual Conference, Progress in Rehabilitation Medicine. Atlanta, GA: *American Congress of Rehabilitation Medicine*, 2017.

[20] Saab J, **Hosman T**, Yin M, Borton DA, Franco B, Kelemen J, Brandman DM, Vilela M, Ciancibello JG, Larson L, Rosler DM, Simeral JD, Nurmikko AV, Hochberg LR. *Wireless intracortical BCI cursor control by a person with tetraplegia*. Program No. 230.05. 2017 Neuroscience Meeting Planner. Washington, DC: *Society for Neuroscience*, 2017. Online.

[21] Vilela M, Ciancibello JG, **Hosman T**, Saab J, Brandman DM, Franco B, Kelemen J, Simeral JD, Hochberg LR. *Assessment of discrete state selection strategies for intracortical brain computer interface applications*. Program No. 230.03. 2017 Neuroscience Meeting Planner. Washington, DC: *Society for Neuroscience*, 2017. Online.

[22] Ciancibello JG, Vilela M, Saab J, **Hosman T**, Hochberg LR, Simeral JD. *Click decoding using "Sub-Region Classification" for intracortical brain computer interfaces*. *Brown Mind/Brain Research Day*, Brown University, Providence, RI. March 30, 2016.

[23] Ciancibello JG, Vilela M, Saab J, **Hosman T**, Rosler DM, Hochberg LR, Simeral JD. *Enabling on-screen click selection by individuals with tetraplegia using Multi-State Classification to decode intended movements from intracortical brain signals*. *National VA Research Week, Providence VA Medical Center*, Providence, RI. May 20, 2016.

[24] Ciancibello JG, Vilela M, **Hosman T**, Saab J, Lesenfants D, Brandman DM, Franco B, Hochberg LR, Simeral JD. *Towards a multi-state click decoder in intracortical brain computer interfaces*. Program No. 439.05. 2016 Neuroscience Meeting Planner. San Diego, CA: *Society for Neuroscience*, 2016. Online.

[25] Lesenfants D, Saab J, **Hosman T**, Vilela M, Jarosiewicz B, Franco B, Simeral JD, Donoghue JP, Hochberg LR. *Idle state detection from motor cortical activity in a person with tetraplegia using an intracortical brain computer interface*. Program No. 439.07. 2016 Neuroscience Meeting Planner. San Diego, CA: *Society for Neuroscience*, 2016. Online.

[26] Vilela M, Ciancibello JG, **Hosman T**, Saab J, Lesenfants D, Franco B, Jarosiewicz B, Simeral JD, Hochberg LR. *Adaptive threshold for point-and-click applications using an intracortical brain computer interface*. Program No. 439.08. 2016 Neuroscience Meeting Planner. San Diego, CA: *Society for Neuroscience*, 2016. Online.

[27] Chavakula V, Fasoli S, Brandman DM, Saab J, **Hosman T**, Franco B, Simeral JD, Donoghue JP, Hochberg LR. *Overcoming contextual differences in motor cortical neural firing patterns when controlling multiple end effector devices using an intracortical BCI*. Program No. 439.11. 2016 Neuroscience Meeting Planner. San Diego, CA: *Society for Neuroscience*, 2016. Online.