Ethan Oblak

Systems engineer with expertise in realtime signal processing, human interfaces, and device design.

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Education

- PhD in Mechanical Engineering, University of Texas at Austin (expected December 2019)
- BASc in Systems Design Engineering, University of Waterloo (2013)

Graduate work

- Graduate Research Assistant in real-time fMRI with Dr. James Sulzer and Dr. Jarrod Lewis-Peacock (2014-present)
  - Developed a framework to simulate how people learn to control fMRI signals in real-time (Oblak et al., 2017)
  - Validated this framework with an fMRI experiment where presses of individual fingers (index/middle/ring/little) could be decoded from 6 seconds of fMRI data (Oblak et al., 2019)
  - Currently using real-time fMRI to train healthy people to shift the neural patterns associated with individual finger movements, with implications for stroke rehabilitation
- Teaching Assistant in Engineering Computational Methods (Fall 2013)

Projects

- Real-time fMRI decoding tool: https://github.com/LewisPeacockLab/instabrain
  - Lightweight Python tool to decode brain states from fMRI in real-time and send the results to a separate feedback display computer
- MRI compatible keyboard: https://github.com/LewisPeacockLab/rewire-keyboard
  - Mechanical, electrical, and firmware design for force-sensitive keyboards with a simple USB interface
- Website for real-time fMRI community (rtfin.org): https://github.com/LewisPeacockLab/rtfin-lit
  - Operates using GitHub Pages and CircleCI to allow community members to submit literature to a repository through pull requests

Skills

- Coding: Python, Matlab, Arduino (familiar with Unity/C#, C++, Ruby, Javascript, CSS)
- CAD: OnShape, Solidworks, EAGLE
- Graphics: Illustrator, Photoshop, Matplotlib

Academics

Publications

- **Oblak, E.**, Sulzer, J., Lewis-Peacock, J. (2019). **A simulation-based approach to improve decoded neurofeedback performance**. *NeuroImage*.
- **Oblak, E.**, Lewis-Peacock, J., Sulzer, J. (2017). **Self-regulation strategy, feedback timing and hemodynamic properties modulate learning in a simulated fMRI neurofeedback environment**. *PLoS Computational Biology*.

- Han, C., **Oblak, E.**, Abraham, L., Ferrari, P., McManis, M., Schnyer, D., Sulzer J. (2017). **An MRI-compatible force sensor for measuring differential isometric precision grip force**. *Proceedings of IEEE EMBS*.
- Sitaram, R., Ros, T., Stoeckel, L., Haller, S., Scharnowski, F., Lewis-Peacock, J., Weiskopf, N., Blefari, M.L., Rana, M., **Oblak, E.**, Birbaumer, N., Sulzer, J. (2016). **Closed-loop brain training: the science of neurofeedback**. *Nature Reviews Neuroscience*.

Invited talks

- Simulated fMRI neurofeedback reveals principles of neural self-regulation (Real-time Functional Imaging and Neurofeedback Conference, Nara, Japan, 2017)

Awards

- Warren A. and Alice L. Meyer Endowed Scholarship in Engineering from UT Austin (2018-2019)
- Funded by a Robert J. Kleberg, Jr. and Helen C. Kleberg Foundation Medical Research Grant (2017-2019)
- NSERC Postgraduate Scholarship (2013-2014)

Undergraduate work

Undergraduate research experience

- Investigated theory of radio network dynamics (with Dr. S.H. Song, Hong Kong University of Science and Technology, Summer 2012)
- Literature review on flip-chip CMUT encapsulation fabrication methods (with Dr. John T.W. Yeow, University of Waterloo, Summer 2011)

Undergraduate co-op work experience

- Lunar rover mobility subsystem mechanical design and experimentation (Neptec Design Group, Fall 2011)
- Simulation testing for Hartsfield-Jackson Atlanta International Airport Concourse E baggage handling system (Brock Solutions, Spring 2011)
- Mechanical and avionics modifications for firefighting aircraft (Conair Group, Summer 2010)