Patrick Beukema

Education

2013 – 2018 **Ph.D.**, *Neuroscience*, University of Pittsburgh.
Thesis: Stability of neural representational geometries

2009 – 2011 **M.S.**, *Logic*, Carnegie Mellon University.
Thesis: Causal inference with a recurrent neural network

2006 – 2009 **B.A.**, McGill University.

Experience

2018 – **Neural Data Scientist**, *Mindx*.
- Building and deploying online machine learning models based on neural decoding.

2013 – 2018 **Fellow**, *University of Pittsburgh & Carnegie Mellon*.
- Published 7 papers (including in Neuron, Neuroimage, Current Opinion)
- Collected and analyzed over 1 TB of high resolution neuroimaging data
- Started and led machine learning seminar for neuroscientists at CMU and U. Pitt
- Codesigned competition winning virtual reality research environment at G4C

Summer 2018 **NeuroHackademy**, *eScience Institute*.
Built two Python libraries for conducting big data neuroimaging deep learning analyses in the cloud

Summer 2016 **Neuroscience consultant**, *Pittsburgh Pirates*.
Designed an experiment to evaluate dynamic speed vision. (GitHub)

Summer 2015 **Project manager**, *4th River Solutions*.
Managed team of three Ph.D. student consultants to conduct cost analysis on a novel drug delivery mechanism to improve women's reproductive health in Sub-Saharan Africa.

Projects

DeepNeuro DCNN based MRI augmentation (T1→T2) using Unets (PyTorch), GitHub

easyHcp Library to interface with Human Connectome Project over s3, GitHub

NeuroHack Machine learning meets neurocience hackathon, YouTube

LabHacks Open source software and other educational resources for neuroscientists, GitHub

DeadSalmon Talk on neuroscience's low statistical power and what to do about it, slides

SayAlphaAgain Replication of Ioannidis simulations with $\alpha = 0.005$ instead of $\alpha = 0.05$, GitHub

LabTv Science outreach to get highschoolers excited about biomedical research, YouTube

Technical Skills

Languages Python (Sklearn, PyTorch, Numpy, Pandas, Statsmodels), Bash, R, Java

Expertise Multimodal neural data analysis using statistical and machine learning methods

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Publications

2018 **Sequence learning networks are segregated**, P. Beukema, T. Verstynen, (in prep).

2018 **Binding during sequence learning does not alter cortical representations of individual actions**, P. Beukema, J. Diedrichsen, T. Verstynen bioRxiv, pdf.

2018 **TrpM8-mediated somatosensation in mouse neocortex**, P. Beukema, K. Cecil, E. Peterson, V. Mann, M. Matsushita, Y. Takashima, S. Navlakha, and A. Barth, J. Comp. Neurology pdf.

2018 **Predicting and binding: algorithms supporting the consolidation of sequential motor skills**, P. Beukema, T. Verstynen, Curr. Opin. Behav. Sci, 20:98–103 pdf.

2017 **Differentiating visual from response sequencing during long-term skill learning**, B. Lynch, P. Beukema, T. Verstynen, J. Cog Neuro, 2017 29:1, 125-136 pdf.

2017 **Amyloid Beta Peptides Block New Synapse Assembly by Nogo Receptor Mediated Inhibition of T-Type Calcium Channels**, Y. Zhao, S. Sivaji, M.C. Chiang, H. Ali, M. Zukowski, S. Ali, B. Kennedy, A. Sklyar, A. Cheng, Z. Guo, A. K. Reed, R. Kodali, J. Borowski, G. Frost, P. Beukema, Z. P. Wills, Neuron 96(2) pdf.

2015 **In vivo characterization of the connectivity and subcomponents of the human globus pallidus**, P. Beukema, T. Verstynen, NeuroImage, 120(15), 382–393 pdf.

2011 **Multiple links between species diversity and temporal stability in bird communities across North America**, G. M. Mikkelson, B. J. McGill, S. Beaulieu, P. Beukema, Evolutionary Ecology Research, 2011, 13: 361–372 pdf.

Conference Presentations

2018 **Sequence learning networks are segregated**, *Janelia*, Ashburn, VA .

2018 **Dissociable cortical networks encode cue and movement sequences**, *Cosyne*, Denver, CO pdf.

2017 **Decoding single finger movements versus movement sequences**, *University of Pittsburgh Brain Institute*, Pittsburgh, PA pdf.

2017 **Dissociable local and global plasticity resulting from motor sequence learning**, *Center for Neuroscience Retreat*, West Virginia pdf.

2016 **Reorganization of cortical motor representations after long term sequential skill learning**, *Organization for Human Brain Mapping*, Geneva, Switzerland pdf.

2016 **Long-term sequence training alters movement representations in primary motor cortex**, *Society for Neuroscience*, San Diego, pdf.

2015 **Long-term skill learning is associated with a reorganization of cortical motor representations**, *MR Community Imaging Retreat*, Pittsburgh pdf.

2014 **Parcellating the internal and external globus pallidus using diffusion based clustering**, *Society for Neuroscience*, Washington, D.C. pdf.

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2013 **Menthol stimulation induces c-fos expression in s2 and granular insular cortex**, *Society for Neuroscience*, San Diego, [pdf](pdf).

Honors

MNTP	Multimodal neuroimaging training program, full tuition & stipend
NIH	National Institute of Health training grant, full tuition & stipend
CMU	Carnegie Scholar, awarded half-tuition
Lewis & Clark	Trustee Scholar, awarded half-tuition