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Born: December 10th, 1979—Gdansk, Poland

Citizenship: Polish, Canadian

Permanent Residency: United States

Appointments

2015- Assistant Professor, Department of Biomedical Engineering, City College of New York
2013-2015 Research Associate, Department of Psychology, Stanford University
2008-2013 Post-Doctoral Fellow, Department of Biomedical Engineering, City College of New York

Education

2008 Ph.D., Telecommunications, Institut National de la Recherche Scientifique, Montreal, Canada
2005 M.A.Sc., Electrical Engineering, Carleton University, Ottawa, Canada
2003 B.ENG. WITH HIGH DISTINCTION, Communications Engineering, Carleton University, Ottawa, Canada

Research Interests

I develop novel techniques for (i) decoding neural signals and (ii) non-invasively modulating activity in the human brain. My group adopts a machine learning approach to infer brain states from neuroimaging data collected in naturalistic settings. We are also engaged in projects that employ electric currents and near-infrared lasers to transcranially modulate cortical excitability and cerebral blood oxygenation, respectively. We make extensive use of biophysical modeling of the human head as well as multivariate statistical techniques to optimize interventions and increase the sensitivity of our decoding methods.

Research Support

- 2017-2020 *Reliability of neural responses as an assay of cognitive state*
ARL/DSO W911-NF-10-2-0022, 900K
Investigators: Dmochowski (PI), Parra
- 2017-2021 *Novel neuromodulation by transcranial infrared brain stimulation with imaging*
NIH-NIMH R01MH14285-01 1900K
Investigators: Liu (PI), Gonzalez-Lima, Husain, Zeng, Dmochowski (Consultant)
- 2017-2019 *Non-invasive brain stimulation approaches to visual system modeling and plasticity*
NIH-NEI R21EY026748-01, 275K
Investigators: Norcia (PI), Dmochowski, Vildavski
- 2016-2020 *A tool-box to control and enhance tDCS spatial precision*
NIH-NIMH R01MH111896-01, 1800K
Investigators: Bikson (PI), Dmochowski, Parra, Wang

Pending Research Support

- 2017-2019 *Repetitive transcranial ultrasonic stimulation for modulating brain rhythms*
NIH-NIDA K18DA045437-01, 300K
Investigators: Dmochowski (PI), Konofagou
Impact Score 20, Council Round October 2017

Publications

JOURNAL ARTICLES

- 2017 **Dmochowski JP**, Koessler L, Norcia AM, Bikson M, Parra LC (2017), “Optimal use of EEG recordings to target active brain areas with transcranial electrical stimulation”, *NeuroImage*, 157:69-80
- 2017 **Dmochowski JP**, Ki J, DeGuzman P, Sajda P, Parra LC (2017), “Multidimensional stimulus-response correlation reveals supramodal neural responses to naturalistic stimuli”, *NeuroImage*.
- 2017 **Dmochowski JP**, Bikson M (2017), Noninvasive neuromodulation goes deep. *Cell*, 169(6):977-978.
- 2017 Wang X, **Dmochowski J**, Husain M, Gonzalez-Lima F, Liu H. (2017), “Transcranial Infrared Brain Stimulation Modulates EEG Alpha Power”, *Brain Stimulation*, 10(4):67-69.
- 2017 Koessler L, Colnat-Coulbois S, Cecchin T, Hofmanis J, **Dmochowski JP**, Norcia, AM, Mail-lard LG (2017). “In-vivo measurements of human brain tissue conductivity using focal electrical current injection through intracerebral multicontact electrodes”, *Human brain mapping*, 38(2):974-986.

- 2017 Khadka N, Zannou AL, Zunara F, Truong DQ, **Dmochowski J**, Bikson M (2017). “Minimal Heating at the Skin Surface During Transcranial Direct Current Stimulation”. *Neuromodulation: Technology at the Neural Interface*.
- 2017 Poulsen AT, Kamronn S, **Dmochowski J**, Parra LC, Hansen LK (2017). “EEG in the classroom: Synchronised neural recordings during video presentation”. *Scientific Reports*, 7.
- 2016 Cancelli A, Cottone C, Tecchio F, Truong DQ, **Dmochowski J**, Bikson M (2016). “A simple method for EEG guided transcranial electrical stimulation without models”. *Journal of neural engineering*, 13(3):036022.
- 2015 **Dmochowski JP**, Norcia AM (2015). “Cortical Components of Reaction-Time during Perceptual Decisions in Humans”. *PloS one*, 10(11):e0143339.
- 2015 **Dmochowski JP**, Greaves AS, Norcia AM (2015). “Maximally reliable spatial filtering of steady state visual evoked potentials”. *NeuroImage*, 109:63–72.
- 2014 **Dmochowski JP**, Bezdek MA, Abelson BP, Johnson JS, Schumacher EH, Parra LC (2014). “Audience preferences are predicted by temporal reliability of neural processing”. *Nature communications*, 5:4567.
- 2014 Richardson JD, Datta A, **Dmochowski J**, Parra L, Fridriksson J. (2014). “HD-tDCS to enhance behavioral treatment for aphasia: A feasibility study”. *Brain Stimulation: Basic, Translational, and Clinical Research in Neuromodulation*, 7(2):e9.
- 2014 Truong DQ, Huber M, Xie X., Datta A, Rahman A, Parra LC, **Dmochowski JP**, Bikson, M. (2014). “Clinician accessible tools for GUI computational models of transcranial electrical stimulation: BONSAI and SPHERES”. *Brain stimulation*, 7(4): 521-524.
- 2013 **Dmochowski JP**, Datta A, Huang Y, Richardson JD, Bikson M, Fridriksson J, Parra LC (2013). “Targeted transcranial direct current stimulation for rehabilitation after stroke”. *Neuroimage*, 75:12-19.
- 2013 Bikson M, **Dmochowski J**, Rahman A. (2013). “The ‘quasi-uniform’ assumption in animal and computational models of non-invasive electrical stimulation”. *Brain stimulation*, 6(4): 704.
- 2013 Huang Y, **Dmochowski JP**, Su Y, Datta A, Rorden C, Parra LC. (2013). “Automated MRI segmentation for individualized modeling of current flow in the human head”. *Journal of neural engineering*, 10(6), 066004.
- 2013 Datta A, **Dmochowski JP**, Guleyupoglu B, Bikson M, Fregni F (2013). “Cranial electrotherapy stimulation and transcranial pulsed current stimulation: a computer based high-resolution modeling study”. *Neuroimage*, 65:280-287.
- 2013 Dias JC, Sajda P, **Dmochowski JP**, Parra LC (2013). “EEG precursors of detected and missed targets during free-viewing search”. *Journal of vision*, 13(13):13-13.
- 2012 **Dmochowski JP**, Bikson M, Parra LC (2012). “The point spread function of the human head and its implications for transcranial current stimulation”. *Physics in medicine and biology*, 57(20):6459.
- 2012 **Dmochowski JP**, Sajda, P, Dias J, Parra, LC (2012). “Correlated components of ongoing EEG point to emotionally laden attention—a possible marker of engagement?” *Frontiers in human neuroscience*, 6.
- 2011 **Dmochowski JP**, Datta A, Bikson M, Su Y, Parra LC (2011). “Optimized multi-electrode stimulation increases focality and intensity at target”. *Journal of neural engineering*, 8(4):046011.
- 2010 **Dmochowski JP**, Sajda P, Parra LC (2010). “Maximum likelihood in cost-sensitive learning: Model specification, approximations, and upper bounds”. *Journal of Machine Learning*

Research, 11(Dec): 3313-3332.

2010 Sajda P, Pohlmeier E, Wang J, Parra LC, Christoforou C, **Dmochowski J**, Hanna B, Bahlmann C, Singh MK, Chang SF (2010). "In a blink of an eye and a switch of a transistor: cortically coupled computer vision". *Proceedings of the IEEE*, 98(3):462-478.

2010 Habets EAP, Benesty J, Cohen I, Gannot S, textbfDmochowski J (2010). "New insights into the MVDR beamformer in room acoustics". *IEEE Transactions on Audio, Speech, and Language Processing*, 18(1):158-170.

2009 **Dmochowski J**, Benesty J, Affes S (2009). "On spatial aliasing in microphone arrays". *IEEE Transactions on Signal Processing*, 57(4):1383-1395.

2009 **Dmochowski J**, Benesty J, Affes S (2009). "An information-theoretic view of array processing". *IEEE transactions on audio, speech, and language processing*, 17(2):392-401.

2008 **Dmochowski J**, Benesty J, Affes S (2008). "Linearly constrained minimum variance source localization and spectral estimation". *IEEE transactions on audio, speech, and language processing*, 16(8):1490-1502.

2007 **Dmochowski JP**, Benesty J, Affes S (2007). "A generalized steered response power method for computationally viable source localization". *IEEE Transactions on Audio, Speech, and Language Processing*, 15(8):2510-2526.

2007 **Dmochowski J**, Benesty J, Affes S (2007). "Direction of arrival estimation using the parameterized spatial correlation matrix". *IEEE Transactions on Audio, Speech, and Language Processing*, 15(4):1327-1339.

2007 Benesty J, Chen J, Huang Y, **Dmochowski J** (2007). "On microphone-array beamforming from a MIMO acoustic signal processing perspective". *IEEE Transactions on Audio, Speech, and Language Processing*, 15(3):1053-1065.

2007 **Dmochowski JP**, Goubran RA (2007). "Decoupled beamforming and noise cancellation". *IEEE Transactions on Instrumentation and Measurement*, 56(1):80-88.

PEER-REVIEWED CONFERENCE PROCEEDINGS

2015 Kaneshiro B, **Dmochowski JP** (2015). "Neuroimaging Methods for Music Information Retrieval: Current Findings and Future Prospects". In *Proceedings of ISMIR*, 538-544.

2014 Zhang JR, Sherwin J, **Dmochowski J**, Sajda P, Kender JR (2014). "Correlating Speaker Gestures in Political Debates with Audience Engagement Measured via EEG". In *Proceedings of the 22nd ACM international conference on multimedia*, 387-396.

2014 Kaneshiro B, **Dmochowski JP**, Norcia AM, Berger J (2014). "Toward an objective measure of listener engagement with natural music using inter-subject EEG correlation". In *Proceedings of the 2014 International Conference on Music Perception and Cognition*.

2012 **Dmochowski JP**, Bikson M, Datta A, Richardson J, Fridriksson J, Parra LC (2012). "On the role of electric field orientation in optimal design of transcranial current stimulation". In *Proceedings of the 2012 Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, 6426-6429.

2012 Huang Y, Su Y, Rorden C, **Dmochowski J**, Datta A, Parra LC (2012). "An automated method for high-definition transcranial direct current stimulation modeling". In *Proceedings of the 2012 Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, 5376-5379.

- 2011 **Dmochowski JP**, Bikson M, Datta A, Su Y, Parra LC (2011). "A multiple electrode scheme for optimal non-invasive electrical stimulation". In *Proceedings of the 5th International IEEE/EMBS Conference on Neural Engineering*, 29-35.
- 2008 **Dmochowski J**, Benesty J, Affes S (2008). "On the use of autoregressive modeling for localization of speech". In *Proceedings of the IEEE Sensor Array and Multichannel Signal Processing Workshop*, 353-356.
- 2008 **Dmochowski JP**, Liu Z, Chou PA (2008). "Blind source separation in a distributed microphone meeting environment for improved teleconferencing". In *Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing*, 89-92.
- 2008 **Dmochowski JP**, Benesty J, Affes S (2008). "Fast steered response power source localization using inverse mapping". In *Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing*, 289-292.
- 2008 **Dmochowski J**, Benesty J, Affes S (2008). "Calibrated acoustic source localization". In *Proceedings of the 24th IEEE Biennial Symposium on Communications*, 383-386.
- 2007 **Dmochowski JP**, Benesty J, Affes S (2007). "Broadband music: opportunities and challenges for multiple source localization". In *Proceedings of the 2007 IEEE Workshop on the Applications of Signal Processing to Audio and Acoustics*, 18-21.
- 2007 **Dmochowski J**, Benesty J, Affes S (2007). "Direction of arrival estimation using eigenanalysis of the parameterized spatial correlation matrix". In *Proceedings of the IEEE International Conference on Acoustics, Speech and Signal Processing*, 1-4.
- 2007 **Dmochowski J**, Benesty J, Affes S (2007). "The generalization of narrowband localization methods to broadband environments via parametrization of the spatial correlation matrix". In *Proceedings of the 15th European Signal Processing Conference*, 763-767.
- 2005 **Dmochowski J**, Goubran R (2005). "Combined Beamforming and Noise Cancellation". In *Proceedings of the IEEE Instrumentation and Measurement Technology Conference*, 1033-1037.
- 2004 **Dmochowski JP**, Goubran R (2004), "Noise cancellation using fixed beamforming". In *Proceedings of the IEEE Workshop on Haptic, Audio and Visual Environments and their Applications*, 141-145.

BOOK CHAPTERS

- 2010 **Dmochowski JP**, Benesty J (2010), *Microphone arrays: fundamental concepts*, In *Speech Processing in Modern Communication*, 199-223, Springer Berlin Heidelberg.
- 2010 **Dmochowski JP**, Benesty J (2010), *Steered beamforming approaches for acoustic source localization*, In *Speech Processing in Modern Communication*, 307-337, Springer Berlin Heidelberg.

Intellectual Property

- 2016 Parra LC, Sajda P, DeGuzman P, Rosenthal D, Cloud P, **Dmochowski JP**, "Method for measuring physiological impact of stimulus features to predict response of subjects to stimuli including such stimulus features". Filed (US).

- 2013 Parra LC, **Dmochowski JP**, “Predicting Response to Stimulus”. United States patent application US 14/433,279. 2013 Oct 11.
- 2013 Bikson M, Datta A, Parra LC, **Dmochowski J**, Su Y. Neurocranial electrostimulation models, systems, devices, and methods. United States patent US 8,494,627. 2013 Jul 23.
- 2012 Liu Z, Chou PA, **Dmochowski J**, “Speech separation with microphone arrays”. United States patent US 8,144,896. 2012 Mar 27.

Industrial Experience

- 2011- Soterix Medical Inc, Scientific Advisor
 2014-2015 Neuromatters LLC, Consultant
 2008 Broadcom Corporation, Intern
 2007 Microsoft Research, Intern

Educational Activities

LECTURING

- 2016- City College of New York: BME 9400, Machine Learning
 2015- City College of New York: BME 205, Bioelectrical Circuits
 2014 Stanford University: BIOE 201, Diagnostic Devices (select lectures)

STUDENTS SUPERVISED

- 2016- Prakhyat Singh, Ph.D. Candidate, City College of New York
 2015- Jason Ki, Ph.D. Candidate, City College of New York

STUDENTS EXAMINED

- 2017 Samantha Cohen, Ph.D. Defense, City College of New York
 2017 Dennis Truong, Ph.D. Defense, City College of New York
 2017 Kofi Agyeman, Master’s Defense, City College of New York
 2016 Kivilcim Afacan, Ph.D. Defense, City College of New York

Invited Talks & Seminars

- 2017 Stanford University, Engagement is in the brain, July 2017
 2017 NYC Neuromodulation, Targeted stimulation of active brain sources using electromagnetic reciprocity, January 2017
 2016 Queen’s University, Targeted stimulation of active brain sources using electromagnetic

- reciprocity, October 2016
- 2016 Google Research, Neural correlates of media engagement, September 2016
- 2016 Technical University of Denmark, Natural stimulus evoked responses as an assay of cognitive state, July 2016
- 2016 Army Research Laboratory, Natural stimulus evoked responses as an assay of cognitive state, May 2016
- 2015 Neuromodec, Designing tDCS montages for clinical efficacy, November 2015
- 2014 Shazam Entertainment Ltd., Neural correlates of media engagement, July 2014
- 2014 Stanford University, Reliable components of EEG are the neural signatures of accumulation-to-bound in a fine perceptual-decision making task, June 2014
- 2014 Association for Psychological Science Annual Convention, EEG synchrony, narrative engagement, and viewing behavior, May 2014
- 2014 Vision Sciences Society Annual Meeting, Neural dynamics of fine motion-direction discrimination, May 2014
- 2013 Stanford University, Dimensions of neural reliability, December 2013
- 2013 Stanford University, Measuring audience engagement with neural signals, October 2013
- 2012 Stanford University, Optimized multichannel transcranial current stimulation, August 2012
- 2012 Arizona State University, Reading the brain during movie viewing, June 2012
- 2012 Rutgers University, Correlated components analysis: reading the brain during movie viewing, March 2012
- 2011 Rutgers University, A Multiple Electrode Scheme for Optimal Non-Invasive Electrical Stimulation, October 2011
- 2011 York University, Canonical correlates of EEG during movie viewing, September 2011
- 2011 City College of New York, Rules of engagement: Canonical Correlates of EEG During Movie Viewing, September 2011
- 2010 Montreal Neurological Institute, Real-time single-trial EEG decoding in a rapid serial visual presentation task, May 2010