

RESEARCH GOALS

My long-term goal is to understand the cerebellar contribution to cognition. In pursuit of this goal, I combine neurophysiology, pharmacology and optogenetics in animals performing cognitive tasks to dissect cerebellar neural circuitry. I study the potential for cerebellar stimulation to rescue cognitive impairments in humans with schizophrenia using EEG but also in animals with pharmacologically induced or genetically modified phenotypes of schizophrenia, and autism. My training in psychology, systems neurophysiology, and clinical psychiatry allows me to target the cerebellum for novel treatments of diseases of cognitive dysfunction.

EDUCATION

August, 2003 -
May, 2009

IOWA STATE UNIVERSITY, Ames, Iowa
Department of Biomedical Sciences
Neuroscience, PhD

Doctoral Dissertation: *"The role of cerebellar nuclear GABAergic neurotransmission in eyeblink motor control"*

August, 2000 - 2003

IOWA STATE UNIVERSITY, Ames, Iowa
Psychology, BS
Minors: Biology and French

FACULTY POSITIONS

August, 2015- Present

UNIVERSITY OF IOWA, Iowa City, Iowa
Department of Neurology
Research Assistant Professor

RESEARCH EXPERIENCE

December, 2012
- July, 2015

UNIVERSITY OF IOWA, Iowa City, Iowa
Department of Neurology
Postdoctoral Fellowship (Dr. Nandakumar Narayanan)

September, 2009 -
December, 2012

UNIVERSITY OF IOWA, Iowa City, Iowa
Department of Psychiatry
Postdoctoral Clinical Fellowship (Dr. Nancy Andreasen)

August, 2002 -
September, 2009

IOWA STATE UNIVERSITY, Ames, Iowa
Behavioral Neuroscience and Electrophysiology
Graduate Student (Dr. Vlastislav Bracha)

September, 2002 -
May, 2003

IOWA STATE UNIVERSITY, Ames, Iowa
Cognitive Neuropsychology
Undergraduate Research Assistant (Dr. Cooper)

May-August, 2002

JOHNS HOPKINS UNIVERSITY, Baltimore, Maryland
Cognitive Neuropsychology
Summer Research Internship (Dr. McCloskey)

September, 2000 -
2002

IOWA STATE UNIVERSITY, Ames, Iowa
Social Psychology
Undergraduate Research Assistant (Dr. Larson)

GRANTS

July, 2015 - 2020	NIH/NIMH K01 Mentored Research Scientist Development Award <i>"The Therapeutic Potential of the Cerebellum in Schizophrenia"</i> - Impact Score 12
March, 2016 - 2017	Nellie Ball Trust Research Grant <i>"Cerebellar Stimulation as a Cognitive Neuroprotective Mechanism in Schizophrenia"</i>
March, 2015 - 2016	Nellie Ball Trust Research Grant <i>"Cerebellar Transcranial Stimulation as a Treatment for Cognitive Impairments in Schizophrenia"</i>
March, 2014 - 2015	Nellie Ball Trust Research Grant <i>"Cerebellar Optogenetic Stimulation Rescues Cognitive Impairments in Schizophrenia"</i>
August, 2014	Brain & Behavior Research Partner's Program Partnered with the Lieber Foundation for Young Investigator Funding
January, 2014 - 2016	NARSAD 2013 Young Investigator <i>"Prefrontal-Cerebellar Interactions in Schizophrenia"</i>
August, 2011 - 2012	Ruth L. Kirschstein National Research Service Award T32 <i>"Major Psychoses & Clinical Neurobiology"</i>

AWARDS

April, 2016	Iowa Center for Research with Undergrads Mentoring Award – Aaron Nessler
January, 2016	Travel Fellowship for Winter Conference on Brain Research, Breckenridge Colorado
August, 2011	Travel Award for Cerebellum Conference - Gordon Research Conference
May, 2009	Research Excellence Award, Iowa State University
April, 2008	Graduate Student Scholarship for Neural Control of Movement Meeting
April, 2007	Travel Award for Neural Control of Movement satellite meeting

ACTIVITIES

November, 2014	Job Search Prep Series Developer and Moderator
October, 2014	Review Editor, <i>Frontiers in Systems Neuroscience</i>
September, 2014	University of Iowa Postdoctoral Association – Professional Development Committee
August, 2014	Coordinator, <i>Systems Neuroscience Journal Club</i>
June, 2014	Cold Spring Harbor Laboratory Workshop on Schizophrenia & Related Disorders
April, 2014	Editorial Assistant to Dr. George Richerson for Elsevier's <i>Modules of Bioscience</i>
August, 2006 - 2008	President of the Neuroscience Graduate Student Organization
August, 2007 - 2008	Program Coordinator for GirLinks, an online mentoring program
August, 2006 - 2008	Preparing Future Faculty (Mentor: Dr. Smiley-Oyen)
August, 2005 - 2006	Secretary of the Neuroscience Graduate Student Organization

TEACHING EXPERIENCE

January - May, 2008	IOWA STATE UNIVERSITY , Ames, Iowa Canine Neuroanatomy <i>Graduate Teaching Assistant</i> (Dr. Uemura)
January - May, 2007	IOWA STATE UNIVERSITY , Ames, Iowa Neural Basis of Human Movement <i>Graduate Teaching Assistant</i> (Dr. Smiley-Oyen)

MENTORING

July, 2014 - 2015	Aaron Nessler - The University of Iowa, Undergraduate Biomedical Engineering
July, 2014 - 2015	Johnathan Kingyon - The University of Iowa, Undergraduate Biomedical Engineering
June - August, 2014	Frida Teran - The University of Iowa, Medical Scientist Training Program
June - August, 2011	Oscar Dimant- The University of Iowa, MSTP SUMR Program
August, 2013 - Present	Eric Emmons- The University of Iowa, Neuroscience Program
December, 2013 - 2014	Stephanie Alberico- The University of Iowa, Neuroscience Program
January, 2015 - Present	Victoria Muller Ewald - The University of Iowa, Neuroscience Program

PUBLICATIONS

Parker, K.L., Kim, Y., Kelly, R.M., Nessler, A., Bijanki, K.C., Andreasen, N.C., and Narayanan, N.S. (Under Review). Cerebellar stimulation compensates for frontal dysfunction.

Emmons, E.E., Ruggiero, R.N., Kelly, R.M., **Parker, K.L.**, and Narayanan, N.S. (Requested Manuscript - 2016). Corticostriatal field potentials are modulated at ~4Hz during interval-timing tasks in rodents. *Frontiers in Biology*.

Parker, K.L. Kim, Y., Alberico, S.L., Emmons, E.E., and Narayanan, N.S. (Requested Manuscript - 2016). Using optogenetics to evaluate striatal function in animal models of Parkinson's disease. *Dialogues in Clinical Neuroscience*.

Parker, K.L. (Requested Manuscript - 2015). Timing tasks synchronize cerebellar and frontal ramping activity and theta oscillations: Implications for cerebellar stimulation in diseases of impaired cognition. *Frontiers in Psychiatry, Research Topic "Eyeblick Classical Conditioning in Psychiatric Conditions: Novel Uses for a Classic Paradigm*. PMID: 26834650

Parker, K.L., Ruggiero, R., and Narayanan, N.S. (Requested Manuscript - 2015). Infusion of D1 dopamine receptor agonist into medial frontal cortex disrupts neural correlates of interval timing. *Frontiers in Behavioral Neuroscience, Research Topic "Neural circuitry of behavioral flexibility: Dopamine and related systems"*. PMID:26617499

Messingham, K., Aust, S., Helfenberger, J., **Parker, K.L.**, Schultz, S., McKillip, J., Narayanan, N.S. and Fairly, J.A. (2015). Autoantibodies to Collagen XVII are Present in Parkinson's disease and Localize to Tyrosine-Hydroxylase Positive Neurons. *The Journal of Investigative Dermatology*.

Parker, K.L., Chen, K.H., Kingyon, J.R., Cavanagh, J.F., & Narayanan, N.S. (2015). Medial frontal ~4Hz activity in humans and rodents is attenuated in PD patients and in rodents with cortical dopamine depletion. *Journal of Neurophysiology*. PMID: 26133799

Parker, K.L., Narayanan, N.S., & Andreasen, N.C. (2014). The therapeutic potential of the cerebellum in schizophrenia. *Frontiers in Systems Neuroscience, Research Topic "Distributed networks: new outlooks on cerebellar function,"* 8:163. PMID: 25309350

Parker, K.L., Chen, K.H., Kingyon, J.R., Cavanagh, J.F., & Narayanan, N.S. (2014). D1-dependent 4 Hz oscillations and ramping activity in rodent medial frontal cortex during interval timing. *Journal of Neuroscience*. PMID: 25505330

Parker, K.L., Lamichhane, D., Caetano, M.S., & Narayanan, N.S. (2013). Interval timing and executive dysfunction in Parkinson's disease. *Frontiers in Integrative Neuroscience*, 7:75. PMID: 24198770

Parker, K.L., Alberico, S.L., Miller, A.D., & Narayanan, N.S. (2013). Prefrontal D1 dopamine signaling influences temporal expectation during reaction-time performance. *Neuroscience*, 255:246-54. PMID: 24120554

Parker, K.L., & Andreasen, N.C. (2013). The CCTCC/Cognitive Dysmetria Model of Schizophrenia: The Role of the Cerebellum. Consensus Paper: The cerebellum's role in movement and cognition. *Cerebellum*, 13(1): 151-77. PMID: 239-96631

Parker, K.L., Andreasen, N.C., Liu, D., Freeman, J.H., & O'Leary, D.S. (2013). Eyeblink conditioning in unmedicated schizophrenia: a positron emission tomography study. *Psychiatry Research – Neuroimaging*, 214(3): 402-9. PMID: 24090512

Parker, K.L., Andreasen, N.C., Liu, D., Freeman, J.H., Ponto, L.L., & O'Leary, D.S. (2012). Eyeblink conditioning in healthy controls: a positron emission tomography study. *Cerebellum*, 11(4): 946-56. PMID: 22430943

Parker K.L., & Bracha, V. (2009). Inactivating the middle cerebellar peduncle abolishes the expression of short-latency conditioned eyeblinks. *Brain Research*, 1303: 32-38. PMID: 19747462

Parker K.L., Zbarska, S., Carrel, A., & Bracha, V. (2009). Blocking GABA_A receptors in interposed nuclei: effects on conditioned and unconditioned eyeblinks. *Brain Research*, 1292: 25-37. PMID: 19635470

Bracha, V., Zbarska, S., **Parker, K.L.**, Carrel, A., Zenitsky, G., & Bloedel, J.R. (2009). The cerebellum and eye-blink conditioning: learning versus network performance hypotheses. *Neuroscience*, 163 (3): 787-796. PMID: 19162131

Ryan, S.B., **Detweiler, K.L.**, Holland, K.H., Hord, M. A., & Bracha, V. (2006). A long range, wide field-of-view infrared eyeblink detector. *Journal of Neuroscience Methods*, 152: 74-82. PMID: 16257057

PRESENTATIONS (* ORAL)

***Parker, K.L.** (2016). The therapeutic potential of the cerebellum in schizophrenia. Psychology Brown Bag, University of Iowa, Iowa City, IA.

***Parker, K.L.** (Panel 2016). Not Just a Relay: Dissecting Structure and Function of the Deep Cerebellar Nuclei in Cognition. Winter Conference on Brain Research, Breckenridge, CO.

***Parker, K.L.** (Mini-symposium 2015). Internally and memory-guided behaviors: The role of frontal cortical ensembles. Society for Neuroscience, Chicago, IL.

Parker, K.L. (2015). Cerebellar stimulation rescues frontal cortex dysfunction. Cerebellar Gordon Research Conference. Bates College, Lewiston, ME.

***Parker, K.L.** (2015). Cerebellar contributions to elementary cognitive processing. University of Iowa, Department of Neurology Grand Rounds, Iowa City, Iowa.

Parker, K.L., Kim, Y., Kelly, R.M., Bijanki, K.R., Andreasen, N.C., & Narayanan, N.S. (2015). A neurophysiologic basis for the therapeutic potential of cerebellar stimulation on cognition in schizophrenia. Society for Neuroscience, Chicago, IL. Emmons, E.B.,

Parker, K.L., Ewald, V.A., & Narayanan, N.S. (2015). Ramping activity of neuronal ensembles in the medial frontal cortex and striatum during interval timing. Society for Neuroscience, Chicago, IL.

Ruggiero, R.N., **Parker, K.L.**, Kingyon, J.R., Kim, Y., Cavanagh, J.F., & Narayanan, N.S. (2015). Dopamine manipulation disrupts delta/theta activity in medial frontal cortex during cognitive tasks in humans and rodents. Society for Neuroscience, Chicago, IL.

Parker, K.L., & Narayanan, N.S. (2014). Cingulocerebellar interactions during interval timing. Society for Neuroscience, Washington D.C.

Emmons, E.B., **Parker, K.L.**, & Narayanan, N.S. (2014). Medial frontal control of striatal neuronal ensembles during interval timing. Society for Neuroscience, Washington D.C.

Parker, K.L., & Narayanan, N.S. (2014). Prefrontal dopamine is essential for temporal control. Midwest Postdoctoral Symposium, University of Iowa, Iowa City, IA.

Parker, K.L., & Narayanan, N.S. (2013). Prefrontal dopamine is essential for temporal control. Society for Neuroscience, San Diego, CA.

Alberico, S.L., **Parker, K.L.,** Miller, A., & Narayanan, N.S. (2013). Prefrontal D1 dopamine signaling influences temporal expectation during reaction-time performance. Society for Neuroscience, San Diego, CA.

Parker, K.L., Freeman, J. H., Block, R.I., Kopeppel, J.A., & O'Leary, D.S. (2011). Brain imaging of eyeblink conditioning following acute marijuana use: effects in the cerebellum. Cerebellum Gordon Research Conference, New London, NH.

Seligman, F.F., **Parker, K.L.,** Ziebell, S.L., & Andreasen, N.C. (2011). Season of birth in relation to brain abnormalities in schizophrenia. Sumr Student University of Iowa, Iowa City, Iowa.

Parker, K.L., O'Leary, D.S., & Andreasen, N.C. (2010). Eyeblink conditioning in healthy normals recruits the bilateral cerebellum: A Positron Emission Tomography Study. Society for Neuroscience, San Diego, CA.

Detweiler, K.L., & Bracha, V. (2008). Suppression of conditioned eyeblinks following inactivation of the middle cerebellar peduncle is associated with elevated tonic firing of cerebellar nuclear neurons. Society for Neuroscience, Washington D.C.

Carrel, A.J., **Detweiler, K.L.,** Zbarska, S., Bloedel, J.R., & Bracha, V. (2008). Are the effects of blocking GABA_A neurotransmission in the cerebellar interposed nuclei restricted to the timing of conditioned responses? Society for Neuroscience, Washington D.C.

Detweiler, K.L., & Bracha, V. (2008). Paradoxical effects of blocking the middle cerebellar peduncle on cerebellar nuclear activity and conditioned eyeblinks in rabbits. Neural Control of movement, Naples, FL.

Detweiler, K.L., & Bracha, V. (2007). Paradoxical effects of blocking the middle cerebellar peduncle on cerebellar nuclear activity and conditioned eyeblinks in rabbits. Society for Neuroscience, San Diego, CA.

Detweiler, K.L., & Bracha, V. (2007). Effect of middle cerebellar peduncle inactivation on the expression of conditioned eyeblinks and on cerebellar nuclear activity. Research Day 2007, Iowa State University, Ames, IA.

Detweiler, K.L., & Bracha, V. (2006). Effect of middle cerebellar peduncle inactivation on the expression of conditioned eyeblinks and on cerebellar nuclear activity. Society for Neuroscience, Atlanta, GA.

Detweiler, K.L., Holland, E.A., Irwin, K.B., & Bracha, V. (2005). Pontine cerebellar afferents and short latency conditioned eyeblinks. Society for Neuroscience, Washington D.C., MD.

Detweiler, K.L., Irwin, K.B., & Bracha, V. (2004). Blocking chloride channels in the interposed nuclei: revealing the nuclear component of conditioned responses or unmasking unconditioned responses to the conditioned stimulus? Society for Neuroscience, San Diego, CA.

Detweiler, K.L., Irwin, K.B., & Bracha, V. (2004). Activation of cerebellar nuclei: exposure of nature or impairment of nurture? Midwest Neuroscience Conference, Chicago, IL.

Ryan, S.B., **Detweiler, K.L.,** Holland K.H., Hord M. A., & Bracha V. (2003). An amplitude-modulated infrared sensor. Society for Neuroscience, New Orleans, LA.

REFERENCES

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Associate Director for Translational Technologies Iowa Institute for Clinical and Translational Science
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Iowa State University
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Iowa State University
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