

# Jared M Cregg, PhD

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Education	<b>Case Western Reserve University</b> PhD, Neuroscience	Cleveland, OH	2018
	<b>Michigan Technological University</b> BSE, Biomedical Engineering	Houghton, MI	2010
Research Positions	<b>Postdoctoral Scholar.</b> Laboratory of Prof. Ole Kiehn Department of Neuroscience, University of Copenhagen Copenhagen, Denmark		2017-present
	<b>Graduate Student.</b> Laboratories of Profs. Jerry Silver & Lynn T Landmesser Department of Neuroscience, Case Western Reserve University Cleveland, OH		2010-2017
	<b>Research Assistant.</b> Laboratory of Dr. John W McDonald, III Department of Neurology, Johns Hopkins University Baltimore, MD		2009-2010
	<b>Research Assistant.</b> Laboratory of Asst. Prof. Ryan J Gilbert Department of Biomedical Engineering, Michigan Technological University Houghton, MI		2007-2009

## Publications *Postdoc*

1. **Cregg JM<sup>†</sup>**, Mirdamadi JL, Fortunato C, Okorokova EV, Kuper C, Nayeem R, Byun AJ, Avraham C, Buonocore A, Winner TS, Mildren RL. (2023) [Highlights from the 31<sup>st</sup> Annual Meeting of the Society for the Neural Control of Movement](#). *Journal of Neurophysiology* 129:220-234. <sup>†</sup>Corresponding author.
2. Leiras R\*, **Cregg JM\***, Kiehn O. (2022) [Brainstem circuits for locomotion](#). *Annual Reviews Neuroscience* 45:63-85. \*Co-first authors.
3. **Cregg JM**, Leiras R, Montalant A, Wanken P, Wickersham IR, Kiehn O. (2020) [Brainstem neurons that command mammalian locomotor asymmetries](#). *Nature Neuroscience* 23:730-740.

## *Graduate*

4. Vagnozzi AN, Garg K, Dewitz C, Moore MT, **Cregg JM**, Jeannotte L, Zampieri N, Landmesser LT, Philippidou P. (2020) [Phrenic-specific transcriptional programs shape respiratory motor output](#). *eLife* 9:e52859.
5. Lager AM, Corradin O, **Cregg JM**, Elitt MS, Shick E, Clayton BL, Allan KC, Olsen HE, Madhavan M, Tesar PJ. (2018) [Rapid functional genetics of the oligodendrocyte lineage using pluripotent stem cells](#). *Nature Communications* 9:3708.
6. **Cregg JM**, Chu KA, Dick TE, Landmesser LT<sup>†</sup>, Silver J<sup>†</sup>. (2017) [Phasic inhibition as a mechanism for generation of rapid respiratory rhythms](#). *Proceedings of the National Academy of Sciences USA* 114:12815-12820. <sup>†</sup>Co-corresponding authors.
7. **Cregg JM**, Chu KA, Hager LE, Maggard RS, Stoltz DR, Edmond M, Alilain WJ, Philippidou P, Landmesser LT, Silver J. (2017) [A latent propriospinal network can restore diaphragm function after high cervical spinal cord injury](#). *Cell Reports* 21:654-665.

8. Niemi JP, DeFrancesco-Lisowitz A, **Cregg JM**, Howarth M, Zigmond RE. (2015) [Overexpression of the monocyte chemokine CCL2 in dorsal root ganglion neurons causes a conditioning-like increase in neurite outgrowth and does so via a STAT3 dependent mechanism](#). *Experimental Neurology* 275:25-37.
9. Gardner RT, Wang L, Lang BT, **Cregg JM**, Dunbar CL, Woodward WR, Silver J, Ripplinger CM, Habecker BA. (2015) [Targeting protein tyrosine phosphatase sigma after myocardial infarction restores cardiac sympathetic innervation and prevents arrhythmias](#). *Nature Communications* 6:6235.
10. Lang BT, **Cregg JM**, DePaul MA, Tran AP, Xu K, Dyck SM, Madalena KM, Brown BP, Weng YL, Li S, Karimi-Abdolrezaee S, Busch SA, Shen Y, Silver J. (2015) [Modulation of the proteoglycan receptor PTP \$\sigma\$  promotes recovery after spinal cord injury](#). *Nature* 518:404-408.
11. **Cregg JM**, DePaul MA, Filous AR, Lang BT, Tran A, Silver J. (2014) [Functional regeneration beyond the glial scar](#). *Experimental Neurology* 253:197-207.
12. Hilton BJ, Lang BT, **Cregg JM**. (2012) [Keratan sulfate proteoglycans in plasticity and recovery after spinal cord injury](#). *Journal of Neuroscience* 32:4331-4333.

#### Undergraduate

13. Hurtado A\*, **Cregg JM\***, Wang HB, Wendell DF, Oudega M, Gilbert RJ, McDonald JW. (2011) [Robust CNS regeneration after complete spinal cord transection using aligned poly-L-lactic acid microfibers](#). *Biomaterials* 32:6068-6079. \*Co-first authors.
14. Wang HB, Mullins ME, **Cregg JM**, McCarthy CM, Gilbert RJ. (2010) [Varying the diameter of aligned electrospun fibers alters neurite outgrowth and Schwann cell migration](#). *Acta Biomaterialia* 6:2970-2978.
15. **Cregg JM**, Wiseman SL, Pietrzak-Goetze NM, Smith MR, Jaroch DB, Clupper DL, Gilbert RJ. (2010) [A rapid, quantitative method for assessing axonal extension on biomaterial platforms](#). *Tissue Engineering Part C: Methods* 16:167-172.
16. Wang HB, Mullins ME, **Cregg JM**, Hurtado A, Oudega M, Trombley MT, Gilbert RJ. (2009) [Creation of highly aligned electrospun poly-L-lactic acid fiber for nerve regeneration applications](#). *Journal of Neural Engineering* 6:016001.

#### Bibliometric Summary

Web of Science: >1600 citations, h-index 11.  
 Google Scholar: >2400 citations, h-index 14.

<b>Patents</b>	Hurtado A, Gilbert RJ, Wang HB, <b>Cregg JM</b> , Mullins ME, Oudega M. Three-dimensional scaffolds, methods for fabricating the same, and methods of treating a peripheral nerve or spinal cord injury. US Patent 10,413,391.		
	Silver J, Lang BT, <b>Cregg JM</b> , Weng YL, Li H, Wu W. Compositions and methods of treating root avulsion injury. US Patent 10,258,672.		
	Lang BT, <b>Cregg JM</b> , Weng YL, Silver J. Compositions and methods for inhibiting the activity of lar family phosphatases. US Patent 9,937,242.		

<b>Grants/ Prizes</b>	Lundbeck Foundation Postdoctoral Fellowship	\$380,000 USD	2021-2024
	EMBO Long-Term Fellowship	\$120,000 USD	2018-2020
	CWRU CTSC Core Pilot Grant	\$7,100 USD	2016-2017
	NSF Graduate Research Fellowship	\$123,500 USD	2010-2013
	Barry M. Goldwater Scholarship	\$15,000 USD	2008-2010

<b>Mentoring</b>	Simrandeep K Sidhu	MS Thesis in Neuroscience, University of Copenhagen	2022
	Paulina Wanken	MS Thesis in Human Biology, University of Copenhagen Current PhD student at Max Planck Institute	2020
	Kevin A Chu	BS Thesis in Biology, Case Western Reserve University Current medical student at NYIT College of Osteopathic Medicine	2017
<b>Teaching</b>	<i>University of Copenhagen</i>		
	Department of Neuroscience		2022
	Lecturer – PhD Course on Animal Models of Disease and Behavior		
	Graduate Program in In Vivo Pharmacology		2021
	Lecturer – MS/PhD Workshop on Animal Models		
	Department of Neuroscience		2018-present
	Lecturer – MS Course on Neuronal Signaling/Neuroscience		
	<i>Case Western Reserve University</i>		
<b>Invited/ Conference Talks</b>	Department of Physiology and Biophysics		2017
	Lecturer – Cell Signaling (ligand gated ion channels, MS/PhD level course)		
	Department of Physiology and Biophysics		2017
	Lecturer – Cardiorespiratory Physiology (cardiac arrhythmias, MS level course)		
	“Basal ganglia-spinal cord pathway that commands locomotor gait asymmetries.” Department of Neuroscience, Karolinska Institutet. 2023—Stockholm, Sweden.		
	“Basal ganglia-spinal cord pathway that commands locomotor gait asymmetries.” School of Psychology and Neuroscience, University of St Andrews. 2023—St Andrews, Scotland.		
	“Basal ganglia-spinal cord pathway that commands locomotor gait asymmetries.” Department of Neurobiology and Behavior, Stony Brook University. 2023—Stony Brook, NY.		
	“Basal ganglia-spinal cord pathway that commands locomotor gait asymmetries.” Department of Neuroscience, Yale University. 2023—New Haven, CT.		
<b>Invited/ Conference Talks</b>	“Basal ganglia-spinal cord pathway that commands locomotor asymmetries.” Department of Neuroscience, Case Western Reserve University. 2022—Cleveland, OH.		
	“Basal ganglia-spinal cord pathway that commands locomotor asymmetries.” Society for the Neural Control of Movement Annual Meeting. 2022—Dublin, Ireland.		
	“Basal ganglia-spinal cord pathway that commands locomotor asymmetries.” Basal Ganglia Gordon Research Seminar. 2022—Ventura, CA.		
	“Basal ganglia-spinal cord pathway that mediates locomotor asymmetries.” Brain States Meeting, Danish Society for Neuroscience. 2021—Copenhagen, Denmark.		
	“Brainstem neurons that command mammalian locomotor asymmetries.” Emerging Neuroscientists Seminar Series, Sainsbury Wellcome Center, University College London. 2020—virtual seminar.		
	“Brainstem neurons that command mammalian locomotor asymmetries.” International Online SCI Research Seminars. 2020—virtual seminar.		

“Brainstem command neurons that specify locomotor direction.” Neuronal Circuits in Motor Behavior at Okinawa Institute of Science and Technology. 2019—Okinawa, Japan

“Optogenetic dissection reveals the architecture of brainstem & spinal cord respiratory circuits.” National Neurotrauma Society Annual Meeting. 2016—Lexington, KY.

“Reversible control of simple respiratory behaviors by optogenetic stimulation of hindbrain or spinal cord interneurons.” Department of Pulmonary, Critical Care, and Sleep Medicine. Case Western Reserve University. 2015—Cleveland, OH.

“Aligned electrospun fibers foster axonal regeneration in a complete transection model of spinal cord injury.” Society for Biomaterials Annual Meeting. 2010—Seattle, WA.

“Migration of Schwann cells into PLLA channels containing aligned, electrospun fibers.” Biomedical Engineering Society Annual Meeting. 2008—St. Louis, MO.

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**Selected  
Conference  
Abstracts**

Cregg JM, Sidhu SK, Leiras R, Kiehn O. Basal ganglia-spinal cord pathway that commands locomotor gait asymmetries. Society for Neuroscience Annual Meeting. 2022—San Diego, CA.

Cregg JM, Sidhu SK, Leiras R, Kiehn O. Basal ganglia-spinal cord pathway that commands locomotor asymmetries. Federation of European Neuroscience Societies Forum. 2022—Paris, France.

Cregg JM, Leiras R, Kiehn O. Basal ganglia-spinal cord pathway that commands locomotor asymmetries. Basal Ganglia Gordon Research Conference. 2022—Ventura, CA.

Cregg JM, Leiras R, Kiehn O. Basal ganglia-spinal cord pathway that mediates locomotor asymmetries. Society for Neuroscience Annual Meeting. 2021—virtual meeting.

Cregg JM, Leiras R, Kiehn O. Brainstem command neurons that specify locomotor direction. Society for Neuroscience Annual Meeting. 2019—Chicago, IL.

Cregg JM, Leiras R, Kiehn O. Spinal projection neurons that control direction orientation during mammalian locomotion. The Brain Prize Meeting. 2018—Middlefart, Denmark.

Cregg JM, Chu K, Dick T, Landmesser LT, Silver J. Optogenetic dissection reveals principles underlying respiratory frequency control. Society for Neuroscience Annual Meeting. 2016—San Diego, CA.

Cregg JM, Chu K, Dick T, Landmesser LT, Silver J. Optogenetic dissection reveals principles underlying respiratory frequency control. Cell Symposium: Big Questions in Neuroscience. 2016—San Diego, CA.

Cregg JM, Landmesser LT, Silver J. Control of diaphragm activity in the absence of supraspinal input: the contribution of interneurons. International Symposium on Neural Regeneration. 2015—Pacific Grove, CA.

Cregg JM, Landmesser LT, Silver J. Control of diaphragm activity in the absence of supraspinal input: the contribution of interneurons. Society for Neuroscience Annual Meeting. 2015—Chicago, IL.

Cregg JM, Wang HB, Gilbert RJ. The role of fiber density in axon motility on aligned topography. Biomedical Engineering Society Annual Meeting. 2009—Pittsburgh, PA.

Cregg JM, Wang HB, Gilbert RJ. Midwest Biomedical Engineering Conference. The role of aligned fiber density in axon motility. 2009—Ann Arbor, MI.

Cregg JM, Wang HB, Mullins ME, Gilbert RJ. Development of polymeric nerve guidance conduits that contain anisotropic cues including aligned microfibers and gradients of adsorbed laminin-1. Design of Medical Devices Conference. 2008—Minneapolis, MN

Cregg JM, Wang HB, Trombley MT. Anisotropic micro-fibrous scaffolds for nerve regeneration applications. Biomedical Engineering Society Annual Meeting. 2007—Los Angeles, CA.

<b>Short Courses/ Workshops (Attendee)</b>	EMBO Course on Laboratory Leadership. Virtual course.	2022
	EMBO Course on Negotiation for Scientists. Heidelberg, Germany.	2020
	Brain Function: Development, Aging and Disease. Lexington, KY.	2016
	Practical Training Course in Confocal Microscopy and Stereology. Chicago, IL.	2010
	Tissue Engineering of the Nervous System. Pittsburgh, PA.	2009
	Peripheral Nerve Regeneration. Georgia Institute of Technology, Atlanta, GA.	2008
<b>Scientific Awards</b>	Scholarship Award—Society for the Neural Control of Movement, 2022.	
	Trainee Professional Development Award—Society for Neuroscience, 2021.	
	Best Poster Award—The Brain Prize Meeting, Middlefart, Denmark, 2018.	
	Doctoral Excellence Award in Neurosciences—Case Western Reserve University, 2018.	
	Travel Award—International Symposium on Neural Regeneration, 2015.	
	Merit Award Winner—Graduate Research Forum Poster Competition, Michigan Technological University, 2009.	
	Summer Undergraduate Research Fellowship—NASA / Michigan Space Grant Consortium, 2008.	
	Summer Undergraduate Research Fellowship— Michigan Technological University, 2008.	
	Grand Prize Winner—Graduate Research Forum Poster Competition, Michigan Technological University, 2008.	
<b>Skills</b>	3 <sup>rd</sup> Prize Winner—Undergraduate Research Poster Competition, Michigan Technological University, 2008.	
	Neuronal Ca <sup>2+</sup> recording – Endoscopic single cell Ca <sup>2+</sup> imaging in freely moving mice, dual-color fiber photometry in freely moving mice.	
	Optogenetics – In vivo freely moving mice, in vitro mouse brainstem/spinal cord preparations. Combination of optogenetics with Ca <sup>2+</sup> recording. ChR2, ChrimsonR, GtACR2.	
	Mouse behavior – DeepLabCut tracking, kinematic analysis, behavioral paradigms for mouse gait analysis.	
	Electrophysiology – In vitro mouse neonatal brainstem/spinal cord preparations (whole nerve extracellular recordings), electromyography in anesthetized and freely moving mice.	
	Molecular biology – Cloning of CRISPR knockin targeting vectors (including sgRNA validation), generation of AAV/lentiviral vectors (cloning & synthesis), RNAscope, genotyping (including primer design), PCR, RT-PCR, western blot, immunochemistry.	
	Anatomy – Detailed anatomical dissection in mouse embryos, neonates, and adults. Mouse surgical experience across developmental timepoints and systems (peripheral, central). Mouse brain anatomy. Fluorescence microscopy (widefield, confocal).	
	Computation – MATLAB, Python, R, Perl, Java, C++. Custom scripting in respective languages.	
	Disease models – Mouse models of Parkinson's disease and spinal cord injury.	
<b>Review</b>	<i>Ad hoc</i> reviewer for <i>Scientific Reports</i> , <i>Experimental Neurology</i> .	
	Co-reviewer with Prof. Ole Kiehn for <i>Cell</i> , <i>Neuron</i> , <i>Nature Communications</i> , <i>Frontiers in Neuroscience</i> .	
	Co-reviewer with Prof. Jerry Silver for <i>Nature Neuroscience</i> .	