

# JAMES (JIMMY) DOOLEY

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## EDUCATION

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<b>University of California, Davis</b>	<b>09/2015</b>
<u>Ph.D. Neuroscience</u>	Advisor: Dr. Leah Krubitzer
Dissertation: <i>Anatomical connections of parietal cortex and visual acuity in <i>Monodelphis domestica</i>: Insights into the brain organization of the mammalian ancestor.</i>	
Committee: Gregg Recanzone, Karen Bales, Kenneth Britten, Leah Krubitzer, Brian Trainor	
<b>University of Chicago</b>	<b>06/2009</b>
<u>B.A. Biology and Psychology</u>	Honors advisor: Dr. Brian Prendergast

## CURRENT POSITION

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<b>Assistant Professor, Purdue University</b>	<b>10/2022 – present</b>
Department of Biological Sciences	

## PAST POSITIONS AND TRAINING

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Postdoctoral Fellow, University of Iowa, Dr. Mark Blumberg	<b>2016 – 2022</b>
Graduate Student/PhD Candidate, UC Davis, Dr. Leah Krubitzer	<b>2010 – 2015</b>
Rotation Student, UC Davis, Drs. Barbara Chapman and Brian Trainor	<b>2009 – 2010</b>
Research Assistant, University of Chicago, Dr. Brian Prendergast	<b>2007 – 2009</b>

## SPECIALTY RESEARCH TRAINING

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Gordon Research Conference, Thalamocortical Interactions	<b>February 2020</b>
Cold Spring Harbor Neural Data Science	<b>July 2017</b>
Gordon Research Conference, Sleep Regulation and Function	<b>March 2016, 2018</b>
Barcelona Cognition, Brain, and Technology Summer School	<b>September 2014</b>

## GRANT SUPPORT

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Showalter Early Investigator Award	7/1/24 to 7/31/25	\$75,000
<i>Effect of serotonin on sensory feedback during sleep and wake across infancy</i>		
Sleep Research Society Foundation	1/1/22 to 6/30/24	\$50,000
Career Development Award		
<i>Theta rhythms during REM sleep promote the developmental integration of primary motor cortex into the sensorimotor network</i>		
Ruth L. Kirschstein National Research Service Award (NRSA) – F32 NS101858	4/1/17 to 3/31/20	\$182,846
<i>Mechanisms for processing expected sensory feedback in early development</i>		
Vision Training Grant – 2T32 EY015387	10/1/14 to 9/30/15	\$44,955
Achievement Reward for College Scientists	9/1/13 to 6/30/14	\$10,000
<i>Effects of early bilateral enucleation on neocortical development</i>		
Vision Training Grant – T32 EY015387	10/1/11 to 9/30/12	\$42,776

## PENDING GRANT SUPPORT

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NINDS – R01 Submitted 6/5/24	3/1/24 to 2/28/29	\$2,339,655
<i>State-dependent development of cortical motor control</i>		

**SELECTED ACADEMIC AWARDS AND SPECIAL RECOGNITION**

College of Science Undergraduate Advising Award ( <i>Purdue University</i> )	<b>2023</b>
Sleep Research Society Outstanding Early Investigator Award	<b>2022</b>
Postdoctoral Research Fellow Excellence Award ( <i>University of Iowa</i> )	<b>2020</b>
Gordon Research Symposium Committee's Award	<b>2018</b>
Ling-Lie Chau Graduate Student Award for Brain Research	<b>2015</b>

**PEER-REVIEWED PUBLICATIONS**

Links to all publications can be found on my [Google Scholar](#) profile.

\*These authors contributed equally to this work.

Published

- Gómez LJ, **Dooley JC**, and Blumberg, MS. (2023). Activity in developing prefrontal cortex is shaped by sleep and sensory experience. *eLife*. 12:e82103.
- Blumberg MS\*, **Dooley JC\***, and Tiriach, A\*. (2022). Sleep, plasticity, and sensory neurodevelopment. *Neuron*. 110: 3230-3242.
- Dooley JC**, Sokoloff G, and Blumberg, MS. (2021). Movements during sleep reveal the developmental emergence of a cerebellar-dependent internal model in motor thalamus. *Current Biology*. 31: 5501-5511.
  - [Commentary by van der Heijden M, Brown AM, and Sillitoe RV. "Motor control: Internalizing your place in the world" in *Current Biology*. 31: R1576-1578].
- Glanz RM, **Dooley JC**, Sokoloff G, and Blumberg MS (2021). Sensory coding of limb kinematics in motor cortex across a key developmental transition. *Journal of Neuroscience*. 41: 6905-6918.
- Sokoloff G, **Dooley JC**, Glanz RM, Yen RY, Hickerson MM, Evans LG, Laughlin HM, Apfelbaum KS, and Blumberg MS. (2021). Twitches emerge postnatally during quiet sleep in human infants and are synchronized with sleep spindles. *Current Biology*. 31: 3426-3432.
  - [Commentary by Tarokh L. "Sleep: Twitch in tempo" in *Current Biology*. 31: R953-R954].
- Gómez LJ, **Dooley JC**, Sokoloff G, and Blumberg, MS. (2021) Parallel and serial sensory processing in developing primary somatosensory and motor cortex. *Journal of Neuroscience*. 41: 3418-3431.
- Dooley JC\***, Glanz RM\*, Sokoloff G, and Blumberg MS (2020) Self-generated whisker movements drive state-dependent sensory input to developing barrel cortex. *Current Biology*. 30: 2404–2410. PMID: PMC7314650
- Blumberg MS, **Dooley JC**, and Sokoloff G (2020) The developing brain revealed during sleep. *Current Opinion in Physiology*. 15: 14–22.
- Dooley JC**, Sokoloff G, and Blumberg MS (2019) Behavioral states modulate sensory processing in early development. *Current Sleep Medicine Reports*. 5: 112–117. PMID: PMC6818957
- Dooley JC**, Krubitzer LA (2019) Alterations in cortical and thalamic connections of somatosensory cortex following early loss of vision. *Journal of Comparative Neurology*. 527: 1675–1688. PMID: PMC6465163
- Dooley JC**, Blumberg MS (2018) Developmental "awakening" of primary motor cortex to the sensory consequences of movement. *eLife*. 7:e41841. PMID: PMC6320070
- Blumberg MS, **Dooley JC** (2017) Phantom Limbs, Neuroprosthetics, and the Developmental Origins of Embodiment. *Trends in Neurosciences*. 40:603–612. PMID: PMC5623093

13. **Dooley JC**, Donaldson MS, and Krubitzer LA (2017) Cortical plasticity following stripe rearing in the marsupial *Monodelphis domestica*: neural response properties of V1. *Journal of Neurophysiology*. 117:566–581. PMID: PMC5288476
14. **Dooley JC**, Franca JG, Seelke, AMH, Cooke DF, and Krubitzer LA (2015) Evolution of mammalian sensorimotor cortex: Thalamic projections to parietal cortical areas in *Monodelphis domestica*. *Frontiers in Neuroanatomy*. 8: 163. PMID: PMC4286717
15. Seelke AMH, **Dooley JC**, and Krubitzer LA (2014) Photic preferences of the short-tailed opossum (*Monodelphis domestica*). *Neuroscience*. 269: 273–280. PMID: PMC4020983
16. Seelke AMH, **Dooley JC**, and Krubitzer L (2014) The cellular composition of the marsupial neocortex. *Journal of Comparative Neurology*. 522: 2286–2298. PMID: PMC4090354
17. Krubitzer L and **Dooley JC** (2013) Cortical plasticity within and across lifetimes: How can development inform us about phenotypic transformation? *Frontiers in Human Neuroscience*. 7:620. PMID: PMC3793242
18. **Dooley JC**, Franca JG, Seelke AMH, Cooke DF, Krubitzer LA (2013) A connection to the past: *Monodelphis domestica* provides insight into the organization and connectivity of the brains of early mammals. *Journal of Comparative Neurology*. 521: 3877–3897. PMID: PMC3959876
19. Laredo SA, Landeros RV, **Dooley JC**, Steinman MQ, Orr V, Silva AL, Crean KK, Robles CF, and Trainor BC (2013) Nongenomic effects of estradiol on aggression under short day photoperiods. *Hormones and Behavior*. 64: 557–565. PMID: PMC3851015
20. Seelke AMH, **Dooley JC**, and Krubitzer LA (2013) Differential changes in the cellular composition of the developing marsupial brain. *Journal of Comparative Neurology*. 521: 2602–2620. PMID: PMC3934569
21. **Dooley JC**, Nguyen HM, Seelke AMH, and Krubitzer L (2012) Visual acuity in the short-tailed opossum (*Monodelphis domestica*). *Neuroscience*. 223: 124–130. PMID: PMC3708803
22. **Dooley JC** and Prendergast BJ (2012) Photorefractoriness and energy availability interact to permit facultative timing of spring breeding. *Behavioral Ecology*. 23: 1049–1058. PMID: PMC3431115
23. Seelke AMH, **Dooley JC**, and Krubitzer LA (2012) The emergence of somatotopic maps of the body in S1 in rats: the correspondence between functional and anatomical representation. *PLoS One*. 7: e32322. PMID: PMC3290658

## BOOK CHAPTERS

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**Dooley, JC** (2018) Neocortex. In: Vonk, J and Shackelford, TK (eds.) *Encyclopedia of Animal Cognition and Behavior*. Springer, Cham.

## SYMPOSIA ORGANIZED

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Symposium organizer and chair, SLEEP meeting, 2023. “Advances in our understanding of neural activity during REM sleep.” Speakers include Drs. Guang Yang, Yuta Senzai, Ashley Ingiosi, Mattia Aime, and James Dooley. June 5, 2023, from 1:30 to 3:30 pm. Session S-07.

Minisymposium organizer and co-chair (with Dr. Greta Sokoloff), Society for Neuroscience, 2022. “Influence of behavioral state on sensorimotor plasticity.” Speakers include Drs. Karsten Rauss, Sofija Canavan, Andrew Jackson, Karunesh Ganguly, Lex Gómez, and Genevieve Albouy. November 12-16, 2022. San Diego, CA.

## UPCOMING INVITED TALKS

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Advances in Sleep and Circadian Science. "Neural activity during REM sleep promotes the development of cortical motor control." Clearwater Beach, Florida. February 15, 2025.

## **PREVIOUS INVITED TALKS**

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Sleep Regulation and Function Gordon Research Conference. "In weanling rats, neural interactions between M1 and the Red Nucleus (a brainstem motor nucleus) are exclusive to periods of REM sleep." Galveston, Texas. March 5, 2024.

University of Louisville Department of Anatomical Sciences and Neurobiology. "Sleep like a baby (rat): How movements during sleep teach the brains of infant rats how their bodies move." Louisville, Kentucky. October 19, 2023.

SLEEP meeting. "REM-sleep promotes the development of cortically-mediated motor control." Indianapolis, Indiana. June 5, 2023.

Okinawa Institute of Science and Technology Neuroscience Online Seminars. "How movements during sleep teach infant brains how their bodies move." April 20, 2023.

Institute for Mind and Biology, University of Chicago. "Sleep like a baby: How movements during sleep teach infant brains how their bodies move." Chicago, Illinois. March 2, 2023.

Motor Behavior Seminar, Purdue University Department of Health and Kinesiology. "Sleep like a baby: How movements during sleep teach infant brains how their bodies move." West Lafayette, Indiana. February 24, 2023.

Seminar for Neurotrauma and Diseases. "How movements during sleep teach infant brains how their bodies move." West Lafayette, Indiana. February 22, 2023.

Purdue University, Department of Psychology. "Sleep like a baby: How movements during sleep teach infant brains how their bodies move." West Lafayette, Indiana. January 18, 2023.

SLEEP meeting. "Theta oscillations during REM sleep synchronize behavior and neural activity in the developing motor system." Charlotte, North Carolina. June 5, 2022.

Johns Hopkins Cerebellum Seminar Series. "Movements during sleep reveal the developmental emergence of both internal models and cortical control of movement." May 31, 2022.

Purdue University, Department of Biological Sciences. "Movements during sleep enable the development of cortical motor control." March 28, 2022.

University of Nevada, Las Vegas Department of Psychology. "Movements during sleep enable the development of cortical motor control." February 7, 2022.

University of Alabama Department of Biological Sciences. "Movements during sleep enable the development of cortical motor control." January 31, 2022.

Sleep Research Society [Virtual Seminar Series](#). "Sleep & The Development of Motor Control in Motor Cortex." January 25, 2022.

University of Wyoming Department of Zoology and Physiology. "Twitches during REM sleep promote the development of motor control in motor cortex." January 20, 2022.

J. B. Johnston Club annual meeting. "Coordinated activity in primary motor cortex and the red nucleus first emerges during REM sleep-associated theta oscillations in preweanling rats." November 12, 2021.

Inside Scientific [invited webinar](#). "Sensorimotor Network Development During Early Postnatal Life in the Awake and Sleeping Brain." September 2, 2021.

- Psychological and Brain Sciences Brown Bag. "Predicting the present: Twitches during active sleep reveal the developmental origins of 'now.'" University of Iowa. February 2021.
- Tucker Davis Technologies invited webinar. "Myoclonic twitches during REM sleep drive neural activity in motor thalamus and motor cortex in preweanling rats." [Online Webinar](#). November 11, 2020.
- International Society for Developmental Psychobiology. "Differences in state-dependent responses to sensory feedback in motor cortex in developing rats." Washington, DC. November 2017.
- Neuroscience Graduate Group Exit Seminar. "Evolution of the mammalian sensory motor cortex and plasticity following early enucleation." University of California, Davis. September 2015.
- Psychology Brown Bag. "Somatosensory connectivity and plasticity in the developing short-tailed opossum neocortex." Department of Psychology, University of California, Davis. January 2015.
- Psychology Data Blitz. "Evolution of mammalian sensorimotor cortex: Thalamic projections to primary somatosensory cortex in *Monodelphis domestica*." Department of Psychology, University of California, Davis. November 2014.
- ARCS Foundation Luncheon, invited student speaker. Fairmont Hotel, San Francisco, CA. October 2014.
- Special Seminar. "Somatosensory connectivity and plasticity in the developing short-tailed opossum neocortex." Department of Psychology, University of Iowa, Iowa City, IA. September 2014.
- Barbara Chapman Scientific Research Symposium. "Multisensory plasticity in the developing short-tailed opossum neocortex following cortical insult." Buehler Alumni Center, University of California, Davis. April 2014.
- Psychology Data Blitz. "Multisensory plasticity in the developing short-tailed opossum neocortex following cortical insult." Department of Psychology, University of California, Davis. October 2013.
- Special Seminar. "Multisensory plasticity in the developing short-tailed opossum neocortex." Princeton University. October 2013.
- Center for Neuroscience Retreat. "Visual plasticity in the short-tailed opossum." Marconi Conference Center. September 2013.
- Neurolunch. "Plasticity following early V1 lesions in *Monodelphis domestica*." Center for Neuroscience, University of California, Davis. May 2012.
- Psychology Brown Bag. "Can cortical plasticity be directed following early loss of vision." Department of Psychology, University of California, Davis. February 2012.
- Vision Research Symposium. "The effect of early visual loss and environment on cross-modal plasticity in *Monodelphis domestica*." Center for Visual Sciences, University of California, Davis. January 2012.

**POSTER PRESENTATIONS**      <sup>†</sup>Graduate student    <sup>‡</sup>Undergraduate

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- Yasko AP<sup>†</sup>, Dooley, JC. State-dependent activity in the infant rat Dorsal Raphe Nucleus. Big10 Neuroscience Conference, June 2024.
- Nanos A<sup>†</sup>, Grobengieser AK<sup>‡</sup>, Dooley, JC. Mapping the cerebral cortex of the developing Long Evans rat in stereotaxic coordinates. Big10 Neuroscience Conference, June 2024.
- Dooley JC, Sokoloff G, Blumberg MS.** Theta rhythmicity during REM sleep functionally integrates behavior with neural activity in primary motor cortex and red nucleus in preweanling rats. Society for Neuroscience, November 2023.
- Gómez LJ, **Dooley JC**, Sokoloff G, Blumberg MS. Thalamic contributions to sensory processing in developing somatosensory and motor cortex. Society for Neuroscience, November 2021.

- Glanz RM, **Dooley JC**, Sokoloff G, Blumberg MS. Sensory coding of limb kinematics in motor cortex across a key developmental transition. Society for Neuroscience, November 2021.
- Sokoloff G, Evans LG, **Dooley JC**, Schmidt JM, Glanz RM, Yen RY, Hickerson MM, Laughlin HM, Apfelbaum KS, Blumberg MS. Twitches emerge during quiet sleep in the early postnatal period and are synchronized with sleep spindles. International Society for Developmental Neurobiology, November 2021.
- Whitehead K, Mistry N, Koskela T, Rupawala M, Meek J, Fabrizi L, **Dooley JC**, Blumberg MS. Face and limb movements in very pre-term human infants. British Neuroscience Association, April 2021.
- Dooley JC**, Sokoloff S, Blumberg MS. Developmental emergence of REM-sleep-associated theta in sensory thalamus and motor cortex in preweanling rats. Gordon Research Conference: Thalamocortical Interactions, Ventura, CA. February 2020.
- Dooley JC**, Sokoloff S, Blumberg MS. Sensory feedback from myoclonic twitches during active sleep continues to activate sensorimotor structures beyond early infancy. Society for Neuroscience, October 2019.
- Gómez LJ, **Dooley JC**, Sokoloff S, Blumberg MS. Functional divergence of sensory responses in developing sensorimotor cortex. Society for Neuroscience, November 2018.
- Dooley JC** and Blumberg MS. Sensory “awakening”: A rapid developmental transition in state-dependent responses in primary motor cortex. Society for Neuroscience, March 2018.
- Dooley JC** and Blumberg MS. Differences in state-dependent responses to sensory feedback in motor cortex of developing rats. Society for Neuroscience, November 2017.
- Dooley JC**, Donaldson MS, and Krubitzer LA. Changes in thalamic connectivity of primary somatosensory cortex resulting from early bilateral enucleations in the short-tailed opossum (*Monodelphis domestica*). Society for Neuroscience, November 2015.
- Dooley JC** and Krubitzer LA. Effects of early, pervasive exposure to stripes on visual acuity and visual response properties in the short-tailed opossum. Society for Neuroscience, November 2014.
- Dooley JC** and Krubitzer LA. Changes in the functional organization of the neocortex following lesions to visual cortex early in development. International Society for Developmental Neurobiology; Society for Neuroscience, November 2014.
- Dooley JC** and Krubitzer LA. Changes in cortical connectivity of primary somatosensory cortex following early loss of vision in the short-tailed opossum (*Monodelphis domestica*). Society for Neuroscience, November 2013. 70.05
- Laredo SA, Villalon Landeros R, Orr V, Silva AL, **Dooley JC**, Crean KK, Steinman MQ, and Trainor BC. Photoperiodic regulation of non-genomic effects of estradiol on aggression. Society for Neuroscience, October 2012. 385.13
- Dooley JC**, Nguyen HM, Seelke AMH, and Krubitzer LA. Visual response properties of visual cortex in short-tailed opossums (*Monodelphis domestica*). Society for Neuroscience, October 2012. 571.27
- Seelke AMH, **Dooley JC**, and Krubitzer LA. Differential Distribution of Neurons within the Neocortex of Short-Tailed Opossums (*Monodelphis domestica*). Society for Neuroscience, October 2012. 894.04
- Dooley JC**, Luu J, Grunewald B, and Krubitzer LA. Tactile discrimination abilities in short-tailed opossums (*Monodelphis domestica*). Society for Neuroscience, November 2011. 517.23
- Landeros RV, Silva AL, **Dooley JC**, Paredes LF, and Trainor BC. Effects of endogenous estradiol on aggressive behavior in male *Peromyscus californicus* mice housed in short day photoperiod. Society of Behavioral Neuroendocrinology, November 2011.
- Dooley JC** and Prendergast BJ. Food restriction delays expression of the seasonal interval timer controlling reproductive development in Siberian Hamsters. University of Chicago honors day poster session, June 2009.

#### TRAVEL AND PRESENTATION AWARDS

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Gordon Research Symposium Travel Award	<b>2020</b>
University of Iowa Postdoctoral Association Travel Award	<b>2019</b>

University of Iowa Postdoctoral Association Travel Award	<b>2017</b>
Travel award to attend the International Society for Developmental Neurobiology meeting	<b>2017</b>
UC Davis Graduate Student Travel Award	<b>2014</b>
UC Davis Center for Visual Science Travel Fellowship	<b>2014</b>
Travel award to attend the International Society for Developmental Neurobiology meeting	<b>2014</b>
Full scholarship to attend Barcelona Cognition, Brain, and Technology Summer School	<b>2014</b>
1st place Best Student Project, Barcelona Cognition Brain, and Technology Summer School	<b>2014</b>
Honorable Mention in UC Davis Interdisciplinary Graduate and Professional Symposium poster contest (people's choice)	<b>2014</b>
2nd place UC Davis Interdisciplinary Graduate and Professional Symposium poster contest	<b>2014</b>
UC Davis Center for Vision Sciences Travel Fellowship	<b>2013</b>
2nd place UC Davis Center for Neuroscience poster contest	<b>2013</b>

## COURSES TAUGHT

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### Professor

Course Name	Commun. clearly	Answers questions	Cares about learning	Makes time	Fair	Inclusive	
<b>Biology 60200 Cellular Neurobiology</b>	4.56	4.56	4.67	4.67	4.67	4.56	<b>Fall 2023</b>
<b>Biology 56200 Neural Systems</b>	4.44	4.52	4.48	4.32	4.12	4.44	<b>Spring 2024</b>

### Teaching Assistant:

Course Name	Knowledge	Enthusiasm	Accessibility	Overall	
Introduction to Psychobiology	4.7	4.8	4.7	4.5	<b>Spring 2014</b>
Comparative Neuroanatomy	4.7	4.8	4.7	4.7	<b>Winter 2013</b>
Physiological Psychology	4.9	4.9	4.9	4.9	<b>Winter 2011</b>

### Course Organizer:

Ethics Topics in Neuroscience **Spring 2013, 2014**

### Guest Lecturer:

Sensory Transduction	<b>PSC 101, Spring 2014, Winter 2015</b>
Cross Modal Plasticity	<b>PSC 121, Winter 2015, Fall 2015</b>
The Visual System	<b>PSC 121, Spring 2015</b>
Multimodal Plasticity	<b>PSC 121, Spring 2015</b>
The Visual and Motor Systems	<b>PSC 101, Spring 2014</b>

## JOURNAL REFEREE

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Behavioral Brain Research	eLife	Neurobiology of Sleep and Circadian Rhythms
Brain Behavior Research	eNeuro	NeuroImage
Brain Disorders	Journal of Neuroscience	Neuron
Current Biology		

**PROFESSIONAL ORGANIZATIONS**

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Society for Neuroscience, Member

International Society for Developmental Psychobiology

Sleep Research Society