

Ashley M. Ingiosi

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Current Position

- 2015 – present **Postdoctoral Research Fellow**, NIH F32 Ruth L. Kirschstein National Research Service Award, Washington State University
- **Mentor:** Marcos Frank, Ph.D.
 - Investigating the role of astroglial calcium signaling in sleep regulation and function using a combination of *in vivo* calcium imaging methodologies and electroencephalography
 - Identified a mouse model of autism spectrum disorder exhibiting clinically relevant sleep impairments using electroencephalography, circadian techniques, and RNA-seq in collaboration with Dr. Lucia Peixoto

Education

- 2008 – 2015 **Ph.D.**, Neuroscience, University of Michigan
- 2002 – 2006 **B.S.**, Biopsychology & Cognitive Science, University of Michigan
- 2002 – 2006 **B.S.**, General Biology, University of Michigan

Research Interests

My research interests include studying how neurons and glia interact to mediate neural physiology and behavior with specific interests and expertise in sleep, neuroinflammation, and autism spectrum disorder. I use a multifaceted approach that includes *in vivo* calcium imaging (miniscope and two-photon microscopy), electrophysiology, optogenetics, and molecular techniques. In this way, I can study glia and neuronal-glia interactions at the molecular, cellular, and circuit levels while also monitoring physiology and behavior in rodent models.

Research Experience

- 2009 – 2014 **Doctoral Research**, University of Michigan
- **Mentor:** Mark Opp, Ph.D., University of Washington*
 - Determined contributions of neurons and astrocytes to sleep and neuroinflammation using transgenic mice I engineered to express interleukin-1 receptor 1 only in the central nervous system and selectively on neurons or on astrocytes
- * Laboratory moved to University of Washington after advancing to candidacy in 2010
- 2009 **Graduate Research**, University of Michigan, semester rotation
- **Advisor:** Michael Sutton, Ph.D.
 - Explored the regulation of the ubiquitin-proteasome system in the axon and the associated effects on neuronal plasticity

- 2008 **Graduate Research**, University of Michigan, semester rotation
- **Advisor:** Anuska Andjelkovic-Zochowska, M.D., Ph.D.
 - Studied the role of Rac and Roh in blood-brain barrier function following extended exposure to hypoxic conditions in brain endothelial cell culture as a model for stroke
- 2006 – 2008 **Research Lab Technician Intermediate**, University of Michigan
- **Supervisor:** Mark Opp, Ph.D.
 - Investigated the impact of immune challenge on sleep-wake behavior and neurocircuitry using sepsis and influenza models
- 2006 **Undergraduate Research Assistant**, University of Michigan
- **Advisor:** Mark Opp, Ph.D.
 - Developed and optimized immunohistochemical and stereological protocols to study immune responses in brain

Fellowships & Grants

- 2017 NIH, National Institute on Drug Abuse, R03 DA042480-01A1
PI: Christopher Hayworth, Ph.D.; Co-I: Marcos Frank, Ph.D.
Role: **Primary Author** and Key Personnel
- 2016 NIH, **Ruth L. Kirschstein National Research Service Award**, National
Institute of Neurological Disorders and Stroke, F32 NS100335-01
- 2014 **Rackham Conference Travel Grant**, University of Michigan
- 2013 **Rackham International Travel Grant**, University of Michigan
- 2012 **Rackham Graduate Student Research Grant**, University of Michigan
- 2011 **Rackham Conference Travel Grant**, University of Michigan

Honors & Awards

- 2019 **Young or New Investigator Award**, World Sleep Society
- 2019 **Best Poster Presentation**, Washington State University Biomedical
Sciences Symposium
- 2019 **Excellence in Presentation**, Inland Northwest Research Symposium
- 2019 **Best Poster Presentation**, Washington State University Sleep and
Performance Research Center
- 2018 **Trainee Professional Development Award**, Society for Neuroscience
- 2016 **Top 10 Abstracts**, Gordon Research Conference on Sleep Regulation and
Function
- 2014 **3rd Place for Excellence in Research**, University of Washington
Department of Anesthesiology & Pain Medicine Academic Evening
- 2014 **Merit Award**, Gordon Research Conference on Sleep Regulation and
Function
- 2013 **Trainee Scholar Award**, PsychoNeuroImmunology Research Society
- 2011 **First Time Attendee Travel Award**, Sleep Research Society

- 2011 **Best in Category**, University of Washington Department of Anesthesiology & Pain Medicine Academic Evening
- 2002 – 2006 **University Honors**, 4 semesters at University of Michigan
- 2002 **Regents' Scholarship**, University of Michigan

Publications

† authors contributed equally

Ingiosi AM, Hayworth CR, Harvey DO, Singletary KG, Rempe MJ, Wisor JP, Frank MG (2020) A role for astroglial calcium in mammalian sleep and sleep regulation. *Curr Biol.* 30:4373-4383.e7. [preprint: <https://doi.org/10.1101/72893>]

See also media mentions under Media Coverage.

Ingiosi AM[†], Schoch H[†], Wintler T, Singletary KG, Righelli D, Roser LG, Medina E, Risso D, Frank MG, Peixoto L (2019) Shank3 modulates sleep and expression of circadian transcription factors. *eLife.* 8:e42819. [preprint doi: <https://doi.org/10.1101/465799>]

Editors' Choice: Osterweil, EK (2019) SHANK3 puts autism to sleep. *Sci Transl Med.* 11:eaax1714.

See also media mentions under Media Coverage.

Ingiosi AM, Opp MR (2016) Sleep and immunomodulatory responses to systemic lipopolysaccharide in mice selectively expressing interleukin-1 receptor 1 on neurons or astrocytes. *Glia.* 64:780-791.

Ingiosi AM, Raymond Jr. RM, Pavlova MN, Opp MR (2015) Selective contributions of neuronal and astroglial interleukin-1 receptor 1 to the regulation of sleep. *Brain Behav Immun.* 48:244-257.

Ingiosi AM, Opp MR, Krueger JM (2013) Sleep and immune function: glial contributions and consequences of aging. *Curr Opin Neurobiol.* Oct;23(5):806-11.

Baracchi F, **Ingiosi AM**, Raymond Jr. RM, Opp MR (2011) Sepsis-induced alterations in sleep of rats. *Am J Physiol Regul Integr Comp Physiol.* 301:R1467-R1478.

Mentorship

- 2018 – 2019 **Mentor**, Association for Women in Science Mentoring Circle Program, Washington State University
- 2018 – present Elizabeth Medina, Washington State University, Neuroscience graduate student
- 2018 Steven Van Cott, Washington State University, research assistant
- 2016 – 2018 Taylor Wintler, Gonzaga University, Biology undergraduate
- 2015 – present Priyanka Bushana, Washington State University, Neuroscience graduate student
- 2015 – 2016 Nikolai Zaperov, Washington State University, research assistant/lab manager
- 2013 Marieke Hoekstra, University of Groningen, Netherlands master's student
- 2012 – 2013 Kelley Jordan, University of Washington, Biology undergraduate
- 2009 – 2010 Christopher Angelakos, University of Michigan, Neuroscience undergraduate

2008 Ali Titz, University of Michigan, summer research intern

Teaching Experience

2020 Invited Lecturer, Shining a light on glial contributions to sleep and sleep regulation. Biology Department Seminar, California State University, Long Beach

2018 – 2019 Teaching Assistant, Evidence-Based Medicine, Washington State University Elson S. Floyd College of Medicine

2009 – 2010 Neuroanatomist, created plastinated human brain teaching models for the University of Michigan Medical School

2009 Teaching Assistant, Introduction to Psychopathology, University of Michigan

Professional Leadership & Service

2020 – present **Reviewer**, Journal of Neuroscience Research

2019 **Invited Speaker**, Washington State University Graduate Research Student Association Biosketch Workshop

2018 – present **Co-Founder & Coordinator**, Washington State University-Spokane Career Advancement for Postdocs

2018 – present **Review Editor**, Frontiers in Neuroscience, Sleep and Circadian Rhythms

2018 – 2019 **Co-Organizer**, Washington State University Elson S. Floyd College of Medicine Training in the Responsible Conduct of Research

2018 **Invited Speaker**, Regional Approaches to Women's Leadership in STEMM Conference

2017 **Invited Speaker**, Washington State University Graduate Research Student Association Biosketch Workshop

2016 – present **Reviewer**, journal SLEEP

2016 - 2017 **Steering Committee**, 2017 joint Sleep Research Society and Canadian Sleep Society satellite meeting

2010 **Host**, University of Michigan Program in Biomedical Sciences recruiting weekend

2010 **Co-Organizer**, University of Michigan Neuroscience Direct recruiting weekend

2008 – 2010 **Administrator**, University of Michigan Neuroscience Graduate Student Organization

Outreach Activities

2019 **Invited Speaker**, March for Science Spokane

2019 **Invited Panelist**, Whitworth University STEM Panel for summer research program

2018 **Discussion Leader**, Autism Awareness for local elementary school

2012 **Organizer**, STEM day for high school Science Reporters Club

2011	Co-Organizer , University of Washington Brain Awareness Week
2010 – 2014	Moderator , The Brain Question
2010 – 2012	Volunteer , University of Washington Neurobiology and Behavior Community Outreach
2008 – 2010	Co-President , BrainsRule!
2008 – 2009	Presenter , NeuroKids

Professional Development

2020	Symposium to Support Graduate Students and Postdocs as Teachers, Professional Development Initiative, Washington State University
2020	PROMISE Summer Success Institute, University of Maryland, Baltimore County
2019	Mitigating Implicit Bias: Tools for the Neuroscientist, Society for Neuroscience
2018	Certificate, Python Data Structures, University of Michigan (via coursera.org)
2018	Certificate, Inspiring and Motivating Individuals, University of Michigan (via coursera.org)
2016	Turning Bias into Opportunity, Association for Women in Science, Washington State University

Memberships in Professional Societies

2019 – present	World Sleep Society
2011 – 2015	PsychoNeuroImmunology Research Society
2007 – present	Sleep Research Society
2007 – present	Society for Neuroscience

Oral Presentations

* denotes invited talks

† denotes competitive extramural postdoctoral seminars

International

* A role for astroglial calcium activity in mammalian sleep and sleep homeostasis. Gordon Research Seminar on Sleep Regulation and Function, Lucca (Barga), Italy, 2020. *Canceled due to COVID-19.*

* A role for astroglial calcium activity in sleep and sleep homeostasis. World Sleep, Vancouver, Canada, 2019.

* Selective contributions of neuronal and astroglial interleukin-1 receptor 1 to behavioral immune responses. PsychoNeuroImmunology Research Society Scientific Meeting, Stockholm, Sweden, 2013.

National

† Of sleep and stars: defining a role for astrocytes in sleep and sleep homeostasis. Carney Institute's Brain Science External Postdoc (BrainExPo) Seminar Series, Brown University, Providence, RI, 2021.

† Of sleep and stars: defining a role for astrocytes in sleep and sleep homeostasis. Seminars at Yale Neuroscience: Advanced Postdoc Extramural Series (SYNAPSES), Yale University, New Haven, CT, 2021.

* Of sleep and stars: defining a role for astrocytes in sleep and sleep homeostasis. Keystone eSymposia on Sleep & Circadian Rhythms: Pillars of Health, Virtual, 2021.

* Twinkle, twinkle little star: defining a role for astrocytes in sleep and sleep regulation. Behavioral Sleep Medicine Seminar Series, University of Arizona, Tucson, AZ, 2020.

* Twinkle, twinkle little star: defining a role for astrocytes in sleep and sleep regulation. Providence Sleep Research Interest Group seminar series, Brown University, Providence, RI, 2020.

* Defining a role for astrocytes in mammalian sleep and sleep regulation. Department of Neuroscience and Regenerative Medicine Seminar, Medical College of Georgia at Augusta University, Augusta, GA, 2020

* Defining a role for astrocytes in mammalian sleep. Seminars in Neuroscience, West Virginia University, Morgantown, WV, 2020.

* Of sleep and stars. Mary A. Carskadon Sleep & Circadian Rhythms Summer Research Fellowship Retreat, Boulder, CO, 2019.

* Astroglial contributions to sleep homeostasis. Neuroscience 2018, Sleep and Circadian Neurobiology Data Blitz, San Diego, CA, 2018.

* Astroglial contributions to sleep homeostasis. Gordon Research Conference on Sleep Regulation and Function, Galveston, TX, 2018.

* Differential sleep responses to immune challenge in mice with the Tnf 55 kD receptor expressed selectively on neurons or astrocytes. SLEEP, Club Hypnos Data Blitz, Denver, CO, 2016.

Year in review. Lake Arrowhead Annual Sleep Training Workshop, Lake Arrowhead, CA, 2015.

Debate: Based on the widely excepted idea that sleep is by the brain and for the brain, changes in other sites or systems cannot be used as an indicator of sleep or sleep loss in a predictable and measurable way. Lake Arrowhead Annual Sleep Training Workshop, Lake Arrowhead, CA, 2013.

Searching for Aurora. Lake Arrowhead Annual Sleep Training Workshop, Lake Arrowhead, CA, 2013.

Biomarkers will reflect the extent of immune challenge in a novel mouse model of narcolepsy. Lake Arrowhead Annual Sleep Training Workshop, Lake Arrowhead, CA, 2012.

Intracerebral communication during sleep is constrained because slow and spindle oscillations often occur out-of-phase in different brain regions. Debate at Lake Arrowhead Annual Sleep Training Workshop, Lake Arrowhead, CA, 2012.

Desynchronized central and peripheral circadian clocks as a risk factor for diabetes. Lake Arrowhead Annual Sleep Training Workshop, Lake Arrowhead, CA, 2011.

Circadian biology of arthritis. Lake Arrowhead Annual Sleep Training Workshop, Lake Arrowhead, CA, 2010.

Role of melanin concentrating hormone signaling in the dorsal raphe: effects on sleep and feeding. Lake Arrowhead Annual Sleep Training Workshop, Lake Arrowhead, CA, 2009.

Local

* Twinkle, twinkle little star (cell), How I wonder what you are (doing during sleep). March for Science, Spokane, WA, 2019.

Twinkle, twinkle little star (cell), How I wonder what you are (doing during sleep). Washington State University Sleep and Performance Research Center Retreat, Coeur d'Alene, ID, 2019.

Astroglial contributions to sleep homeostasis. Washington State University Sleep and Performance Research Center Retreat, Coeur d'Alene, ID, 2017.

Abnormal sleep-wake behavior in Shank3 mouse model of autism. Washington State University Sleep and Performance Research Center Retreat, Coeur d'Alene, ID, 2017.

* Contributions of neuronal and astroglial interleukin-1 receptor 1 to sleep and immune responses. University of Washington Academic Evening, Seattle, WA, 2014.

Deconstructing neuronal and glial contributions to inflammatory immune responses. 12th Annual Fink Memorial Research Conference, Seattle, WA, 2012.

Deconstructing neuronal and glial contributions to inflammatory immune responses. Rosario Beach Marine Laboratory Seminar, Seattle, WA, 2012.

Deconstructing neuronal and glial contributions to inflammatory immune responses. University of Michigan Neuroscience Graduate Program Seminar Series, Ann Arbor, MI, 2012.

Neuronal-glial interactions in the regulation of sickness behavior. University of Washington Sleep Rounds, Seattle, WA, 2011.

* Novel mouse models for the investigation of neuronal-glial immune interactions. Harborview Medical Center Neuroscience Seminar, Seattle, WA, 2011.

Neuronal-glial interactions in the regulation of sickness behavior. University of Michigan Molecular & Integrative Physiology Seminar, Ann Arbor, MI, 2010.

Conference Presentations: Talks & Posters

Ingiosi AM, Hayworth CR, Harvey DO, Singletary KG, Rempe MJ, Wisor JP, Frank MG. A role for astroglial calcium activity in mammalian sleep and sleep homeostasis. Oral & poster presentation at Gordon Research Conference and Seminar on Sleep Regulation and Function, Lucca (Barga), Italy, 2020. *Canceled due to COVID-19.*

Ingiosi AM, Hayworth CR, Harvey DO, Wisor JP, Frank MG. A role for astroglial calcium activity in sleep and sleep homeostasis. Oral & poster presentation at World Sleep, Vancouver, Canada, 2019.

Schoch H, **Ingiosi AM**, Wintler T, Singletary KG, Medina E, Frank MG, Peixoto L. Developmental trajectory of sleep disturbances in a Shank3 mouse model of autism. Poster at World Sleep, Vancouver, Canada, 2019.

Ingiosi AM, Hayworth CR, Harvey DO, Singletary KG, Rempe MJ, Wisor JP, Frank MG. Astroglial contributions to sleep and sleep homeostasis. Poster at Biomedical Sciences Symposium, Spokane, WA, 2019.

- Ingiosi AM**, Hayworth CR, Harvey DO, Wisor JP, Frank MG. Astroglial contributions to sleep and sleep homeostasis. Poster at Inland Northwest Research Symposium, Spokane, WA, 2019.
- Ingiosi AM**, Wintler T, Schoch H, Singletary KG, Righelli D, Roser LG, Risso D, Frank MG, Peixoto L. Shank3 modulates sleep and expression of circadian transcription factors. Poster presented by Wintler T at International Society for Autism Research Meeting, Montreal, Canada, 2019.
- Schoch H, **Ingiosi AM**, Wintler T, Singletary KG, Medina E, Frank MG, Peixoto L. Developmental trajectory of sleep disturbances in a Shank3 mouse model. Poster at International Society for Autism Research Meeting, Montreal, Canada, 2019.
- Ingiosi AM**, Hayworth CR, Harvey DO, Wisor JP, Frank MG. Astroglial contributions to sleep and sleep homeostasis. Poster at Gordon Research Conference and Seminar on Glial Biology, Ventura, CA, 2019.
- Ingiosi AM**, Hayworth CR, Harvey DO, Wisor JP, Frank MG. Astroglial contributions to sleep homeostasis. **Dynamic poster** & poster at Neuroscience, San Diego, CA, 2018.
- Ingiosi AM**, Davis CJ, Dunbrasky D, Pavlova MN, Krueger JM, Opp MR. Differential sleep responses to immune challenge in mice with the Tnf 55 kD receptor expressed selectively on neurons or astrocytes. Poster & oral presentation at SLEEP, Denver, CO, 2016.
- Ingiosi AM**, Davis CJ, Dunbrasky D, Pavlova MN, Krueger JM, Opp MR. Differential sleep responses to immune challenge in mice with the Tnf 55 kD receptor expressed selectively on neurons or astrocytes. Poster at Gordon Research Conference and Seminar on Sleep Regulation and Function, Galveston, TX, 2016.
- Ingiosi AM**, Opp MR. Contributions of neuronal and astroglial interleukin-1 receptor 1 to sleep and immune responses. Poster and oral presentation at University of Washington Academic Evening, Seattle, WA, 2014.
- Ingiosi AM**, Opp MR. Selective contributions of neuronal and astroglial interleukin-1 receptor 1 to sleep and central immune responses. Poster at Gordon Research Conference on Sleep Regulation and Function, Galveston, TX, 2014.
- Ingiosi AM**, Opp MR. Selective contributions of neuronal and astroglial interleukin-1 receptor 1 to immunomodulation and behavioral immune responses. Poster at Lake Arrowhead Annual Sleep Training Workshop, Lake Arrowhead, CA, 2013.
- Ingiosi AM**, Opp MR. Selective contributions of neuronal and astroglial interleukin-1 receptor 1 to behavioral immune responses. Oral presentation at PsychoNeuroImmunology Research Society Scientific Meeting, Stockholm, Sweden, 2013.
- Ingiosi AM**, Opp MR. Selective contributions of neuronal and astroglial interleukin-1 receptor 1 to behavioral immune responses. Poster at University of Washington Academic Evening, Seattle, WA, 2013.
- Ingiosi AM**, Pavlova MN, Raymond Jr. RM, Opp MR. Deconstructing neuronal and glial contributions to inflammatory immune responses. Poster at Neuroscience, New Orleans, LA, 2012.
- Ingiosi AM**, Pavlova MN, Raymond Jr. RM, Opp MR. Deconstructing neuronal and glial contributions to inflammatory immune responses. Poster at Lake Arrowhead Annual Sleep Training Workshop, Lake Arrowhead, CA, 2012.

Ingiosi AM, Pavlova MN, Raymond Jr. RM, Opp MR. Novel mouse models for the investigation of neuronal-glia immune interactions. Poster at PsychoNeuroImmunology Research Society Scientific Meeting, San Diego, CA, 2012.

Ingiosi AM, Pavlova MN, Raymond Jr. RM, Opp MR. Deconstructing neuronal and glial contributions to inflammatory immune responses. Poster at University of Washington Academic Evening, Seattle, WA, 2012.

Ingiosi AM, Pavlova MN, Raymond Jr. RM, Opp MR. Novel mouse models for the investigation of neuronal-glia immune interactions. Poster at Neuroscience, Chicago, IL, 2011.

Talsma AM, Baracchi F, Raymond Jr. RM, Opp MR. IL-1 receptor 1 and TNF receptor 1 mediate LPS-induced alterations in sleep. Poster at University of Washington Academic Evening, Seattle, WA, 2011.

Talsma AM, Sutton BC, Titiz AS, Opp MR. Pre-clinical studies of the effects of hypnotics on immune response to influenza infection. Poster at Lake Arrowhead Annual Sleep Training Workshop, Lake Arrowhead, CA, 2009.

Talsma AM, Raymond Jr. RM, Opp MR. Sepsis-induced alterations in sleep: role of cholinergic and GABAergic systems. Poster at Neuroscience, Washington, DC, 2008.

Talsma AM, Waugh S, Priestley J, Raymond Jr. RM, Opp MR. Cytokine-induced alterations in rapid eye movement sleep: role of cholinergic and GABAergic brainstem systems. Poster at Lake Arrowhead Annual Sleep Training Workshop, Lake Arrowhead, CA, 2007.

Media Coverage

[“The twinkling stars of the brain”](#) 12 November 2020. Water Cooler Neuroscience podcast.

[“Amid pandemic, U.S. faculty job openings plummet”](#) 6 October 2020. Science.

[“Why do brains need sleep? These ‘twinkling’ star-shaped cells may help us find out”](#) 29 September 2020. Popular Science.

[“Coffee Break with Dr. Ashley Ingiosi”](#) 29 September 2020. Inscopix Blog.

[“Science column: How we sleep”](#) 24 September 2020. CBC Radio: All in a Day.

[“Astrocytes, not just neurons, play a role in sleep”](#) 24 September 2020. The Scientist.

[“Star-shaped brain cells may hold the key to why, how we sleep”](#) 24 September 2020. WSU Insider.

[“How much sleep you need each night and warning signs that you're not getting enough, according to neuroscientists”](#) 9 July 2020. Insider.

[“Sleep struggles in autistic people may have genetic basis”](#) 3 May 2019. Spectrum.

[“Understanding insomnia in autism spectrum disorder”](#) 29 April 2019. eLife Digest.

[“WSU study links gene to sleep problems in autism”](#) 29 April 2019. WSU Insider.