JOSHUA P. NEUNUEBEL, Ph.D.

Blue highlights entries since appointment at the University of Delaware

CONTACT INFORMATION

University of Delaware	Cell: (979) 739-5737
Psychological and Brain Sciences	Office: (302) 831-4811
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ACADEMIC POSITIONS

May 2023 – Present	Associate Professor; **University of Delaware** Department of Psychological and Brain Sciences
Aug. 2014 – May 2023	Assistant Professor; **University of Delaware** Department of Psychological and Brain Sciences

EDUCATION

Dec 2010	**Ph.D.** in Neuroscience, Department Neurobiology and Anatomy **University of Texas Health Science Center-Houston**, Houston, TX
May 2004	**M.S.** in Biology, Department of Biology **Texas A&M University,** College Station, TX
May 2001	**B.S.** in Cell and Molecular Biology **Texas A&M University,** College Station, TX

RESEARCH EXPERIENCE

Jan 2011 – July 2014	Postdoctoral Fellow; **HHMI Janelia Research Campus** Advisor: Dr. Roian Egnor, Ph.D.
Dec 2010 – Jan 2011	Postdoctoral Fellow; **Johns Hopkins University** Advisor: James J. Knierim, Ph.D.
April 2009 – Dec 2010	Visiting Doctoral Student; **Johns Hopkins University** Advisor: James J. Knierim, Ph.D.
Sept 2004 – Dec 2010	Doctoral Student; **University of Texas Health Science Center-Houston** Advisor: James J. Knierim, Ph.D.
Sept 2001 – March 2004	Masters Student; **Texas A&M University** Advisor: Mark J. Zoran, Ph.D.

RESEARCH INTERESTS

- Neural encoding of social information

- Neuroethology
- Innate social behavior
- Communication
- Reproductive behavior
- Animal behavior
- Mouse ultrasonic vocalizations
- Aggression
- Autism spectrum disorders
- Sex differences in acoustic communication

GRANT SUPPORT

Ongoing Research Projects

1. NIMH Biobehavioral Research Awards for Innovative New Scientists
   R01MH122752 (Joshua P. Neunuebel, Principal Investigator)
   Role: Principal Investigator
   Project Title: *Neural Encoding of Social Information*
   Total awarded: $2,962,428 (direct + indirect)
   06/2020 – 03/2025
2. NIH COBRE Grant
   P20GM104316 (Joe Fox, Principal Investigator)
   Role: Consultant for Neunuebel, M. Ramona (Target Investigator, subaward, subproject Principal Investigator)
   Project Title: *Molecular mechanisms supporting bacterial survival within immune cells*
   Total awarded: $35,044 (direct + indirect)
   06/2020 – 03/2023

Pending

1. NIDCD
   R01 (Matt Smear, Ron Yu, & Josh Neunuebel Principal Investigators)
   Role: Principal Investigator
   Project Title: ***The impact of anosmia on active olfaction.***
   Total requested: ~$2,500,000
   09/2024 – 08/2029
2. NIDCD
   R01 (Ho Ming Chow, Aditya Dutta, & Josh Neunuebel Principal Investigators)
   Role: Principal Investigator
   Project Title: ***A multidisciplinary and integrative approach for elucidating the neurobiology of developmental stuttering.***
   Total requested: TBD
   09/2024 – 08/2029

Completed Research Support

1. NIGMS
   T32GM142603-01A (Shawn Polson, Abhyudai Singh, Karen Hoober, Cathy Wu, Multiple Principal Investigators)

Role: Graduate Trainer
Project Title: *Graduate Training Program in Computational Biology, Bioinformatics and Biomedical Data Science (CBB).*
Total awarded: $1,425,395 (direct + indirect)
07/2022 – 06/2027

2. NSF Campus Cyberinfrastructure
   Award #1659377 (John Goodhue, Principal Investigator)
   Role: Subaward, subproject Principal Investigator
   Project Title: *Optimization of Mouse Social Behavior Data Analyses Pipeline*
   Total awarded: $3,000 (direct)
   09/2020 – 02/2021
3. NIH COBRE Grant
   P20GM103653 (Melissa Harrington, Principal Investigator)
   Role: Target Investigator, subaward, subproject Principal Investigator
   Project Title: *Neural Processing of Mouse Social Communication*
   Total awarded: $175,717 (direct + indirect)
   09/2019 – 08/2020
4. NIH COBRE Grant
   P20GM103653 (Melissa Harrington, Principal Investigator)
   Role: Target Investigator, subaward, subproject Principal Investigator
   Project Title: *Neural Processing of Mouse Social Communication*
   Total awarded: $117,000 (direct + indirect)
   09/2018 – 08/2019
5. NIH COBRE Grant
   P20GM103653 (Melissa Harrington, Principal Investigator)
   Role: Target Investigator, subaward, subproject Principal Investigator
   Project Title: *Neural Processing of Mouse Social Communication*
   Total awarded: $61,200 (direct + indirect)
   03/2018 – 08/2018
6. University of Delaware Research Foundation (UDRF)
   Role: Principal Investigator
   Project Title: *Investigating neural control of social communication in mouse models of autism.*
   Total awarded: $35,000 (direct)
   06/2015 – 05/2017
7. General University Research Grant (GUR)
   Role: Principal Investigator
   Project Title: *Deciphering social communication in mouse models of autism.*
   Total awarded: $8,137 (direct)
   06/2015 – 05/2016
8. NIH Neuroscience Departmental Training Grant
   T32NS07467
   Role: Appointee as graduate student @ UT Health Science Center at Houston
   11/2005-08/2007

Other Support

1. Good Nature Research Fund Donation
   Role: Principal Investigator
   Project Title: *Mouse prosocial vocal behavior.*
   Total awarded: $10,000 (direct)
   01/2019 – 12/2020

PUBLICATIONS

Peer reviewed

† = mentored undergraduate student; * = mentored graduate student

1. Ma YA*, Warren MR*, & **Neunuebel JP.** Sex differences in the acoustic directionality of mouse ultrasonic vocalizations. In preparation for *Frontiers in Behavioral Neuroscience*.

2. Warren MR* & **Neunuebel JP.** Spectrum of autism-like adult mice emit ubiquitous behavior-dependent vocalizations. In preparation for *eLife*.

3. Clein RS*, Warren MR*, & **Neunuebel JP.** Automated behavioral analysis reveals that mice employ a bait and switch escape mechanism to deescalate conflict. Under review at *PLOS Biology*.

4. Salles A & **Neunuebel JP**. What do mammals have to say about the neurobiology of acoustic communication? [version 2; peer review: 2 approved]. 2023, 2:5 (https://doi.org/10.12688/molpsychol.17539.2)

5. Warren MR*, Spurrier MS†, Sangiamo DT†, Clein RS*, & **Neunuebel JP.** Mouse vocal emission and acoustic complexity do not scale linearly with the size of a social group. *J Exp Biol* 224, (2021). doi: 10.1242/jeb.243045.

6. Sangiamo DT†, Warren MR*, & **Neunuebel JP.** Ultrasonic signals associated with different types of social behavior of mice. *Nature Neuroscience*. 2020 Mar;23(3):411-422. doi: 10.1038/s41593-020-0584-z.

   Feature in:

   ** Nature Research Highlights

   ** Eurek Alert, AAAS

   ** Technology Networks

   ** Medical Press

   ** News Medical Life Sciences

   ** News Wise

   ** Sciencenewsnet.in

   ** Digital Trends

   ** UDaily

** Recommended by Faculty Opinions as special significance, August 5, 2020

** In the top 5% of all research outputs scored by Altimetric

7. Warren MR*, Clein RS*, Spurrier MS†, Roth ED, & **Neunuebel JP.** Ultrashort-range, high-frequency communication by female mice shapes social interactions. *Scientific Reports*. 2020 Feb 14;10(1):2637. doi: 10.1038/s41598-020-59418-0.

8. GoodSmith D, Lee H, **Neunuebel JP**, Song H, & Knierim JJ. Dentate Gyrus Mossy Cells Share a Role in Pattern Separation with Dentate Granule Cells and Proximal CA3 Pyramidal Cells. *J Neurosci*. 2019 Nov 27;39(48):9570-9584. doi: 10.1523/JNEUROSCI.0940-19.2019.

9. Warren MR*, Spurrier MS†, Roth ED, & **Neunuebel JP.** Sex Differences in vocal communication of freely interacting adult mice depend upon behavioral context. *PLOS One*, 2018; Sep 21;13(9):e0204527. doi: 10.1371/journal.pone.0204527.

10. Warren MR*, Sangiamo DT†, & **Neunuebel JP.** High Channel Count Microphone Array Accurately and Precisely Localizes Ultrasonic Signals from Freely-Moving Mice. *Journal Neuroscience Methods*, 2018; S0165-0270(17)30431-4. doi: 10.1016/j.jneumeth.2017.12.013.

11. Knierim JJ, **Neunuebel JP**. Tracking the flow of hippocampal computation: Pattern separation, pattern completion, and attractor dynamics. *Neurobiol Learn Mem*, 2016; 129: 38-49. doi: 10.1016/j.nlm.2015.10.008.

12. **Neunuebel JP**, Taylor AL, Arthur BJ, Egnor SR. Female mice ultrasonically interact with males during courtship displays. *eLife*, 2015; 4. doi: 10.7554/eLife.06203.

    Featured in:

    ** eLife Podcast

    ** Science News

    ** Scientific American

    ** Delaware Public Media

13. Knierim JJ, **Neunuebel JP**, Deshmukh SS. Functional correlates of the lateral and medial entorhinal cortex: objects, path integration and local-global reference frames. *Philos Trans R Soc Lond B Biol Sci*, 2014. doi: 10.1098/rstb.2013.0369

14. **Neunuebel JP**, Knierim JJ. CA3 retrieves coherent representations from degraded input: direct evidence for CA3 pattern completion and dentate gyrus pattern separation. *Neuron*, 2014; 81: 416-27. doi: 10.1016/j.neuron.2013.11.017

    ** Previewed in Neuron, 2014, doi: 10.1016/j.neuron.2014.01.004

    ** Recommended by Faculty of 1000 as special significance, September 8, 2014

15. **Neunuebel JP**, Yoganarasimha D, Rao G, Knierim JJ. Conflicts between local and global spatial frameworks dissociate neural representations of the lateral and medial entorhinal cortex. *J Neurosci*, 2013; 33: 9246-58. doi: 10.1523/JNEUROSCI.0946-13.2013

    ** Featured Article

    ** Highlighted in Current Biology, 2013, doi: 10.1016/j.cub.2013.07.018

16. **Neunuebel JP**, Knierim JJ. Spatial firing correlates of physiologically distinct cell types of the rat dentate gyrus. *J Neurosci*, 2012; 32: 3848-58. doi: 10.1523/JNEUROSCI.6038-11.2012

    ** Featured Article

17. Siegel JJ, **Neunuebel JP**, Knierim JJ. Dominance of the proximal coordinate frame in determining the locations of hippocampal place cell activity during navigation. *J Neurophysiol*, 2008; 99: 60-76. doi: 10.1152/jn.00731.2007

18. **Neunuebel JP**, Zoran MJ. Electrical synapse formation disrupts calcium-dependent exocytosis, but not vesicle mobilization. *Synapse*, 2005; 56: 154-65. doi: 10.1002/syn.20139

PUBLICATIONS

Preprint

† = mentored undergraduate student; * = mentored graduate student

1. Clein RS*, Warren MR*, and **Neunuebel JP**. Automated behavioral analysis reveals that mice employ a bait-and-switch escape mechanism to de-escalate social conflict. bioRxiv. 2024 Jan 12:2024.01.12.575321. doi: 10.1101/2024.01.12.575321. Preprint.

CONFERENCE PRESENTATIONS AND ABSTRACTS

1. Y.A. Ma, C.D. Escobar-Amado, M.R. Warren, and **J.P. Neunuebel**. Sex and behavioral differences in bioacoustic directionality of mouse ultrasonic vocalizations. Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2023.
2. D.A. Pande, M.R. Warren, R.S. Clein, and **J.P. Neunuebel**. Examining vocal communication and mating preferences in mice during courtship. Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2023.
3. C.J. Collins, Y.A. Ma, J.D. Turk, and **J.P. Neunuebel**. The acoustic characteristics of ultrasonic vocalizations emitted by individual mice change throughout development. Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2023.
4. Y.A. Ma, C.D. Escobar-Amado, M.R. Warren, and **J.P. Neunuebel**. Sex and behavioral differences in bioacoustic directionality of mouse ultrasonic vocalizations. Interdisciplinary Neuroscience Program Symposium. Newark, DE, 2023.

5. D.A. Pande, M.R. Warren, R.S. Clein, and **J.P. Neunuebel**. Examining vocal communication and mating preferences in mice during courtship. Interdisciplinary Neuroscience Program Symposium. Newark, DE, 2023.
6. C.J. Collins, Y.A. Ma, J.D. Turk, and **J.P. Neunuebel**. The acoustic characteristics of ultrasonic vocalizations emitted by individual mice change throughout development. Interdisciplinary Neuroscience Program Symposium. Newark, DE, 2023.
7. R.S. Clein, M.R. Warren, and **J.P. Neunuebel**. Novel computational approach reveals altered group dynamics in Shank3b mutant mice. 2022. Delaware Neuroscience Symposium.
8. R.S. Clein, M.R. Warren, and **J.P. Neunuebel**. Characterizing collective behavior in groups of Shank3b mice using a sound source localization system. Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2022.
9. Y.A. Ma, M.R. Warren, and **J.P. Neunuebel**. Sex differences in the acoustic directionality of mouse ultrasonic vocalizations. Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2022.
10. D.A. Pande, M.R. Warren, R.S. Clein, J.D. Turk, Y.A. Ma, and **J.P. Neunuebel**. Evaluating the behavioral preferences of individual mice during courtship. Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2022.
11. K.C. Chen and **J.P. Neunuebel**. Investigating social vocalizations and movement of freely interacting anosmic mice. Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2022.
12. J.D. Turk, M.R. Warren, and **J.P. Neunuebel**. Segmentation of mouse social behavior using an unsupervised machine learning approach. Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2022.
13. C.J. Collins, Y.A. Ma, and **J.P. Neunuebel**. Examining the developmental trajectory of mouse ultrasonic vocal emission. Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2022.
14. C. Kawar, J.D. Turk, and **J.P. Neunuebel**. Quantifying ultrasonic vocalizations of Piezo2-deficient mice during group interaction. Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2022.
15. J. Hensley, R.S. Clein, and **J.P. Neunuebel**. Establishing a Pipeline for Quick and Reliable Neural Spike Sorting. 2022. Summer Scholars Poster Session.
16. R.S. Clein, M.R. Warren, and **J.P. Neunuebel**. Evaluating vocal and social behavior in groups of Shank3b mice. 2022. Society for Behavioral Neuroendocrinology. Atlanta, GA.
17. R.S. Clein, M.R. Warren, and **J.P. Neunuebel**. State-dependent behavioral flexibility underlies defensive strategies during social encounters. 2021. Animal Behavior Society. Online.
18. C. Kawar, R.S. Clein, M.R. Warren, and **J.P. Neunuebel**. Evaluating ultrasonic vocalizations as predictors of social behavior during group interaction. 2021. Animal Behavior Society. Online.

19. Y.A. Ma, M.R. Warren, and **J.P. Neunuebel**. Investigating the Acoustic Directionality of Mouse Ultrasonic Vocalization. 2021. Animal Behavior Society. Online.

20. R.S. Clein, M.R. Warren, and **J.P. Neunuebel**. Knockout of the autism-associated gene *Shank3B* leads to alterations in social and vocal behavior in female mice. Neuroscience Meeting Planner. Chicago, IL: Society for Neuroscience, 2021. *Cancelled due to pandemic.

21. C. Kawar, R.S. Clein, M.R. Warren, and **J.P. Neunuebel**. Evaluating ultrasonic vocalizations as predictors of social behavior during group interaction. Neuroscience Meeting Planner. Chicago, IL: Society for Neuroscience, 2021. *Cancelled due to pandemic.

22. Y.A. Ma, M.R. Warren, and **J.P. Neunuebel**. Investigating the Acoustic Directionality of Mouse Ultrasonic Vocalization. Neuroscience Meeting Planner. Chicago, IL: Society for Neuroscience, 2021. *Cancelled due to pandemic.

23. J. Turk, M.R. Warren, and **J.P. Neunuebel**. Unsupervised mouse behavior analysis with self-organizing maps. Neuroscience Meeting Planner. Chicago, IL: Society for Neuroscience, 2021. *Cancelled due to pandemic.

24. C. Kawar, R.S. Clein, M.R. Warren, and **J.P. Neunuebel**. Evaluating ultrasonic vocalizations as predictors of social behavior during group interaction. 2021. Acoustical Society of America. Seattle, Washington.

25. Y.A. Ma, M.R. Warren, and **J.P. Neunuebel**. Investigating the Acoustic Directionality of Mouse Ultrasonic Vocalization. 2021. Acoustical Society of America. Seattle, Washington.

26. R.S. Clein, M.R. Warren, and **J.P. Neunuebel**. Enhanced contribution of female Shank3B knockout mice to social dynamics. 2021. Society for Social Neuroscience Annual Meeting. Online.

27. R.S. Clein**, D.T. Sangiamo, M.R. Warren, and **J.P. Neunuebel**. Experience dependent behavioral flexibility during social interaction. SFN Global Connectome - A virtual event. Online Zoom Conference, 2021.

    a. **Received a Trainee Professional Development Award

28. R.S. Clein, D.T. Sangiamo, M.R. Warren, and **J.P. Neunuebel**. Quantifying dynamic social and vocal behavior of freely interacting mice using a sound source localization system. *Delaware Neuroscience Symposium*, 2019.

29. M.R. Warren, R.S. Clein, and **J.P. Neunuebel**. Using a sound source localization system to determine the function of mouse vocal signals during naturalistic group interaction. *Delaware Neuroscience Symposium*, 2019.

30. L. Armus, M. R. Warren, and **J.P. Neunuebel**. Quantifying Dynamic, Complex Vocal Sequences Emitted by Freely Interacting Mice. *Delaware Neuroscience Symposium*, 2019.

31. R.S. Clein, D.T. Sangiamo, M.R. Warren, and **J.P. Neunuebel**. Quantifying dynamic social and vocal behavior of freely interacting mice using a sound source localization system. Program No. 498.06. 2019 Neuroscience Meeting Planner. Chicago, IL: Society for Neuroscience, 2019. Online.

32. M.R. Warren, R.S. Clein, and **J.P. Neunuebel**. Using a sound source localization system to determine the function of mouse vocal signals during naturalistic group interaction. Program No. 498.05. 2019 Neuroscience Meeting Planner. Chicago, IL: Society for Neuroscience, 2019. Online.

33. M. Smolens, M.R. Warren, R.S. Clein, and **J.P. Neunuebel**. Examining the Relationship between Mouse Vocalization and Spatial Location. 2019. Summer Scholars Poster Session.

34. D.T. Sangiamo, M.R. Warren, and **J.P. Neunuebel**. Ultrasonic vocabulary defined by social behavior of mice. 2019. West Dover, VT**:** Gordon Research Conference on Neuroethology Behavior, Evolution and Neurobiology.

35. M.R. Warren and **J.P. Neunuebel**. Using a sound source localization system to quantify autism-like deficits in mice during naturalistic group interaction. 2018 Delaware Neuroscience Symposium.

    b. M.R. Warren won best graduate poster.

36. L.A. Meckler, M.R. Warren, M.S. Spurrier, E.D. Roth, and **J. P. Neunuebel**. Using sound source localization to investigate the impact of the reproductive cycle on mouse communication. 2018 Delaware Neuroscience Symposium.

    c. L. A. Meckler 2nd place for best undergraduate poster.

37. M.R. Warren and **J.P. Neunuebel**. Using a sound source localization system to quantify autism-like deficits in mice during naturalistic group interaction. Program No. 407.15. 2018 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2018. Online.

38. R.S. Clein, D.T. Sangiamo, and **J.P. Neunuebel**. Investigating the role that social status plays in vocal courtship behavior using a sound source localization system. Program

No. 407.14. 2018 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2018. Online.

39. D. Goodsmith, H. Lee, **J.P. Neunuebel**, and J.J. Knierim. Responses of granule cells, mossy cells, and proximal CA3 cells to local/global cue mismatch indicate a shared role in pattern separation. Program No. 330.07. 2018 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2018. Online.

40. M.R. Warren and **J.P. Neunuebel**. Using a sound source localization system to quantify autism-like deficits in mice during naturalistic group interaction. 2018 Champalimaud Research Symposium - Quantitative Approaches to Behaviour and Neural Systems. Lisbon, Portugal.

41. R.S. Clein, D.T. Sangiamo, and **J.P. Neunuebel**. Quantifying the dynamic nature of social status in mice. 2018 Champalimaud Research Symposium - Quantitative Approaches to Behaviour and Neural Systems. Lisbon, Portugal.

42. L.A. Meckler, M.R. Warren, M.S. Spurrier, E.D. Roth, and **J. P. Neunuebel**. Using sound source localization to investigate the impact of the reproductive cycle on mouse social communication. 2018. Summer Scholars Poster Session.

43. T. Wilkerson, M.R. Warren, and **J.P. Neunuebel**. Investigating the Role Pheromones Play in Social Communication. 2018. Summer Scholars Poster Session.

44. M.R. Warren and **J.P. Neunuebel**. Sound source localization system reveals ultrasonic communication in groups of freely interacting mice. 2017 Delaware Neuroscience Symposium.

    d. M.R. Warren won best graduate poster.

45. L.A. Meckler, M.R. Warren, M.S. Spurrier, E.D. Roth, and **J. P. Neunuebel**. Using sound source localization to investigate the impact of the reproductive cycle on mouse vocal expression. 2017 Delaware Neuroscience Symposium.

    e. L. A. Meckler 3rd place for best undergraduate poster.

46. M.R. Warren and **J.P. Neunuebel**. Quantification of social communication in a mouse model of autism using a sound source localization system. Program No. 157.07. 2017 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2017. Online.

47. D.T. Sangiamo, M.R. Warren, and **J.P. Neunuebel**. Sound source localization system reveals ultrasonic semantic communication in groups of freely interacting mice. Program No. 157.05. 2017 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2017. Online.

48. L.A. Meckler, M.R. Warren, M.S. Spurrier, E.D. Roth, and **J.P. Neunuebel**. Using sound source localization to investigate the impact of the reproductive cycle on mouse vocal expression. Program No. 157.06. 2017 Neuroscience Meeting Planner. Washington, DC: Society for Neuroscience, 2017. Online.

49. D.T. Sangiamo, M.R. Warren, X. Zhong, and **J.P. Neunuebel**. Male mice emit ultrasonic vocalizations during agonistic interactions. 2016 Delaware Neuroscience Symposium.

    f. D.T. Sangiamo won best undergraduate poster.

50. M.S. Spurrier, E.R. Roth, M.R. Warren, and **J.P. Neunuebel**. Sex differences in the acoustic structure of mouse ultrasonic vocalizations. 2016 Delaware Neuroscience Symposium.

    g. M.S. Spurrier won 2nd place for best undergraduate poster.

51. M.R. Warren and **J.P. Neunuebel**. Direct quantification of a social communication deficit in a mouse model of autism. 2016 Delaware Neuroscience Symposium.

52. D.T. Sangiamo, M.R. Warren, X. Zhong, and **J.P. Neunuebel**. Male mice emit ultrasonic vocalizations during agonistic interactions. Program No. 444.02. 2016 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2016. Online.

53. M.S. Spurrier, E.R. Roth, M.R. Warren, and **J.P. Neunuebel**. Sex differences in the acoustic structure of mouse ultrasonic vocalizations. Program No. 444.03. 2016 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2016. Online.

54. M.R. Warren and **J.P. Neunuebel**. Direct quantification of a social communication deficit in a mouse model of autism. Program No. 444.04. 2016 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2016. Online.

55. M. Spurrier and **J.P. Neunuebel**. Sex differences in the acoustic structure of mouse ultrasonic vocalizations. 2016. Summer Scholars Poster Session.

56. D. Sangiamo and **J.P. Neunuebel**. The Relationship Between Ultrasonic Vocalizations and Agonistic Behaviour. 2015. Summer Scholars Poster Session.

57. X. Zhong and **J.P. Neunuebel**. Examining the Role of Mouse Ultrasonic Vocalizations During Exploration in a Novel Environment. 2015. Summer Scholars Poster Session.

58. **J.P. Neunuebel**, and S.E.R. Egnor. Localization of ultrasonic vocalizations emitted by both male and female mouse models of Fragile X while socially interacting. Program No. 584.01. 2013 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2013. Online.

59. K. Seagraves**, J.P. Neunuebel**, and S.E.R. Egnor. Female rejection and male vocal behavior may play an intimate role in the mating behavior of the house mouse. Program No. 584.02. 2013 Neuroscience Meeting Planner. San Diego, CA: Society for Neuroscience, 2013. Online.

60. **J.P. Neunuebel**, A.L. Taylor, and S.E.R. Egnor. Ultrasonic vocal interaction between male and female mice during courtship. Society for Neuroscience Satellite Meeting, Mechanisms of Communication: Critical Periods and Social Learning, 2013.

61. **J.P. Neunuebel**, A.L. Taylor, and R.S.E. Egnor. Identifying the source of mouse ultrasonic vocalizations during social interaction using a four-channel microphone array. Program No. 296.05. 2012 Neuroscience Meeting Planner. New Orleans, LA: Society for Neuroscience, 2012. Online.

62. J.P. Neunuebel, A.L. Taylor, and R.S.E. Egnor. Localizing the source of mouse ultrasonic vocalizations using a four-channel microphone array. 2012 Front. Behav. Neurosci. Conference Abstract: Tenth International Congress of Neuroethology. doi: 10.3389/conf.fnbeh.2012.27.00326**.**

63. **J.P. Neunuebel** and J.J. Knierim. Cells of the dentate gyrus polymorphic layer have spatial firing with multiple, irregularly distributed fields. Program No. 405.16. 2010 Abstract Viewer/Itinerary Planner. San Diego, CA: Society for Neuroscience, 2010. Online.

64. **J.P. Neunuebel**, G. Rao, D. Yoganarasimha, and J.J. Knierim. Differential control of lateral and medial entorhinal cortex by local and global cues. Program No. 100.4. 2009 Abstract Viewer/Itinerary Planner. Chicago, Ill: Society for Neuroscience, 2009.

65. **J.P. Neunuebel** and J.J. Knierim. CA3 place fields respond more coherently than dentate gyrus fields in a local-global cue-mismatch manipulation. Program No. 90.4. 2008 Abstract Viewer/Itinerary Planner. Washington, DC: Society for Neuroscience, 2008. Online.

66. J.J. Siegel, **J.P. Neunuebel**, G. Rao, J.J. Knierim. Increased partial remapping rates are associated with proportional decreases in the fidelity of place activity by cells that maintain similar firing fields within hippocampal ensembles. Program No. 205.18. 2007 Abstract Viewer/Itinerary Planner. San Diego, CA: Society for Neuroscience, 2007. Online.

67. **J.P. Neunuebel**, J.J. Siegel, G. Rao, J.J. Knierim. The effects of goal-directed behavior on hippocampal representations of space. Program No. 574.6. 2006 Abstract Viewer/ Itinerary Planner. Washington, DC: Society for Neuroscience, 2006. Online.

68. J.J. Siegel, **J.P. Neunuebel**, G. Rao, J.J. Knierim. Differences in population coherence of CA3 and CA1 place cell ensembles in a spatial navigation task: pattern completion vs. pattern separation. Program No. 574.7. 2006 Abstract Viewer/Itinerary Planner. Washington, DC: Society for Neuroscience, 2006. Online.

69. K.K. Ricks, **J.P. Neunuebel**, M.J. Zoran. Electrical synapse formation disrupts calcium-dependent exocytosis but not vesicle mobilization. Program No. 834.11. 2005 Abstract Viewer/Itinerary Planner. Washington, DC: Society for Neuroscience, 2005. Online.

70. **J.P. Neunuebel** and M.J. Zoran. Mechanism underlying the suppression of chemical neurotransmission in regenerating *Helisoma* neurons. Program No. 898.13. 2003 *Abstract Viewer/Itinerary Planner.* Washington, DC: Society for Neuroscience. Online.

71. **J.P. Neunuebel** and M.J. Zoran. Calcium dynamics at regenerating synapses in cell culture. Program No. 730.11. 2002 Abstract Viewer/Itinerary Planner. Washington, DC: Society for Neuroscience, 2002. Online.

STUDENT MENTORING

Current Lab Members (Lab Manager)

Fall 2020–Present	Sarah Paige Werner, Lab Manager, Institution: University of Delaware

Current Lab Members (Graduate Students)

Summer 2023–Present	Zoe Shteyn, Masters, Behavioral Neuroscience, Institution: University of Delaware
Winter 2021–Present	Devashish Arvind Pande, Doctoral, Interdisciplinary Neuroscience Program, Institution: University of Delaware
Fall 2021–Present	Kaihang (Chris) Chen, Doctoral, Behavioral Neuroscience, Institution: University of Delaware
Summer 2021–Present	Claudia Collins, Doctoral, Interdisciplinary Neuroscience Program, Institution: University of Delaware
Winter 2020–Present	Joel Turk, Doctoral, Bioinformatics Data Science, Institution: University of Delaware
Fall 2020–Present	Christyana Kawar, Doctoral, Interdisciplinary Neuroscience Program, Institution: University of Delaware
Summer 2020–	Yichong (Andre) Ma, Doctoral, Interdisciplinary Neuroscience

Present	Program, Institution: University of Delaware

Current Lab Members (Undergraduate Students)

Past Lab Members (Graduate Students)

Fall 2018–Spring 2019	David Maisson, Masters, Behavioral Neuroscience, Institution: University of Delaware
Summer 2017–Present	Rachel Clein, Doctoral, Behavioral Neuroscience, Institution: University of Delaware
Summer 2017–Summer 2020	Lauren Armus, Masters, Biological Sciences, Institution: University of Delaware
Summer 2015–Summer 2020	Megan Warren, Doctoral, Behavioral Neuroscience, Institution: University of Delaware

Past Lab Members Rotations (Graduate Students)

Fall 2019–Fall 2019	Drake Bahajak, Doctoral, Biological Sciences, Institution: University of Delaware

Past Lab Members (Undergraduate Students)

Spring 2022–Fall 2022	Jason Hensley, Neuroscience, Computer Science, UD
Summer 2022–Summer 2022	Lillian Lowenthal, English, Vassar College
Fall 2021–Winter 2022	Gabrielle Tayne, Health Sciences, UD
Spring 2020–Winter 2020	Sabrina Bruckner, Neuroscience, UD
Winter 2019–Spring 2020	Marina Smolens, Electrical Engineering, UD
Winter 2019–Spring 2020	Elena Riccardi, Psychology, UD
Fall 2017–Spring 2020	Ana Tegtmeier, Neuroscience, UD
Fall 2017–Spring 2020	Andrew Rahe, Neuroscience, UD
Fall 2016–Spring 2020	Lauren Meckler, Neuroscience, UD

Winter 2018–Winter 2019	Tanner Wilkerson, Neuroscience, UD
Winter 2018–Spring 2018	Mary Butler, Neuroscience, UD
Summer 2017–Spring 2018	Bryan Wright, Neuroscience, UD
Summer 2017–Spring 2018	Paige Burcham, Neuroscience, UD
Fall 2017–Spring 2018	Jacob Jones, Neuroscience, UD
Fall 2016–Spring 2017	Nicole Kozak, Neuroscience, UD
Fall 2016–Spring 2017	Belen Healy, Neuroscience, UD
Fall 2016–Spring 2017	Grace Crawford, Neuroscience, UD
Summer 2016–Summer 2016	Hannah Poore, Neuroscience, West Chester University
Fall 2015–Fall 2016	Julie King, Neuroscience, UD
Fall 2015–Fall 2015	Christine Hill, Neuroscience, UD
Spring 2015–Fall 2016	Daniel Sangiamo, Neuroscience, UD
Spring 2015–Winter 2016	Becky Gessler, Neuroscience, UD
Spring 2015– Fall 2015	Xiaxin Zhong, Neuroscience, UD
Spring 2015– Spring 2017	Morgan Spurrier, Neuroscience, UD

University of Delaware Dissertation Committees

Summer 2022– Fall 2023	Rachel Clein, Doctoral, Behavioral Neuroscience Role: Chair
Fall 2019– Spring 2023	John Stout, Doctoral, Behavioral Neuroscience Role: Member
Summer 2018– Summer 2020	Megan Warren, Doctoral, Behavioral Neuroscience Role: Chair
Summer 2018– Summer 2020	Alexandra Turano, Doctoral, Behavioral Neuroscience Role: Member

University of Delaware Thesis Committees

Fall 2023– Present	Zoe Shteyn, Masters, Behavioral Neuroscience Role: Chair
Fall 2018– Spring 2019	David Maisson, Masters, Behavioral Neuroscience Role: Chair
Summer 2018– Spring 2019	Andrew Garcia, Masters, Behavioral Neuroscience Role: Member
Summer 2017– Summer 2020	Lauren Armus, Masters, Behavioral Neuroscience Role: Chair
Fall 2017– Spring 2018	John Stout, Masters, Behavioral Neuroscience Role: Member
Spring 2017– Fall 2017	Alicia Edsall, Masters, Behavioral Neuroscience Role: Member
Fall 2016– Spring 2017	Hollie Sanders, Masters, Behavioral Neuroscience Role: Member

University of Delaware Advisory Committees

Fall 2023– Present	Zoe Shteyn, Masters, Behavioral Neuroscience Role: Chair
Spring 2022– Present	Juntian Wei, Doctoral, Biological Sciences Role: Member
Spring 2022– Present	Devashish Arvind Pande, Doctoral, Interdisciplinary Neuroscience Program Role: Chair
Spring 2022– Present	Kaihang (Chris) Chen, Doctoral, Behavioral Neuroscience Role: Chair
Spring 2022– Present	Claudia Collins, Doctoral, Interdisciplinary Neuroscience Program Role: Chair

Spring 2021–Present	Yichong (Andre) Ma, Doctoral, Interdisciplinary Neuroscience Program Role: Chair
Spring 2021–Present	Christy Kawar, Doctoral, Interdisciplinary Neuroscience Program Role: Chair
Spring 2020–Present	Su Hyeong Kim, Doctoral, Behavioral Neuroscience Role: Member

University of Delaware Undergraduate Thesis Committees

Fall 2020–Spring 2021	Taylor Hamill, Neuroscience
Fall 2019–Spring 2020	Lauren Meckler, Neuroscience
Fall 2016–Spring 2017	Morgan Spurrier, Neuroscience
Spring 2016–Fall 2016	Daniel Sangiamo, Neuroscience

PROFESSIONAL EXPERIENCE

Ad Hoc Reviewer

1. Neurotoxicology
2. Journal of Neurophysiology
3. PLOS One
4. Hippocampus
5. Cerebral Cortex
6. Frontiers in Behavioral Neuroscience
7. Learning and Memory
8. eLife
9. Comparative Medicine
10. JoVE
11. Behavioral Neuroscience
12. Physiology of Behavior
13. Journal of Neuroscience
14. JASA
15. BMC

University Service

- Nu Rho Psi
- Faculty Search Committees
- Summer Scholars Mentee-Mentor Liaison
- Library Liaison
- Animal Facility Scientific Advisory Committee
- Behavioral Neuroscience Seminar Series Organizer (2022-2023, 2015-2016)
- Bridge Day Participant
- Behavioral Neuroscience Bolus Beverage and Data Blitz Organizer
- Psychological and Brain Sciences Graduate Recruitment
- Biological Sciences Graduate Recruitment
- Psychological and Brain Sciences Graduate Student Annual Evaluations
- Psychological and Brain Sciences Qualifier Committees
- Biological Sciences Comprehensive Exam Committees
- Delaware INBRE Summer Scholars Mentor
- Kenkel Lab Manager Search Committee
- Griffin Lab Manager Search Committee
- Guest Lecturer NSCI629
- Guest Lecture RCR Seminar for Bioinformatics Data Science T32 Grant

External Service

Oct 2022	*Ad hoc* reviewer, NIH-BRAIN Initiative: Targeted BRAIN Circuits Projects (R01 and R34 applications)
March 2022	*Ad hoc* reviewer, NIH-BRAIN Initiative: Targeted BRAIN Circuits Projects (R01 and R34 applications)
Jan 2022	*Ad hoc* reviewer, NSERC Discovery Grants, the Research Council of Canada
Nov 2021	*Ad hoc* reviewer, NIMH Biobehavioral Research Awards for Innovative New Scientists (R01 applications)
Nov 2020	*Ad hoc* reviewer, NIH-BRAIN Initiative: Targeted BRAIN Circuits Projects (R01 and R34 applications)
Feb 2020	*Ad hoc* reviewer, NWO, the Dutch Research Council
Dec 2014–Dec 2019	Poster Judge; Delaware Neuroscience Research and Poster Symposium
Oct 2018	University of Delaware's representative at the Annual Sigma Xi

	Conference
Oct 2017	Organized Symposium at Pavlovian Society
Oct 2015	Newark Highschool STEM Outreach Program--Interview

Memberships

2024 – Present	ACHEMS
2020 – Present	Nu Rho Psi
2018 – Present	Sigma Xi
2017 – Present	Pavlovian Society
2015 – 2016	Association for Psychological Science
2012 – Present	International Congress of Neuroethology
2002 – Present	Society for Neuroscience

Development

March 2017	Best Practices in Mentoring Course
March 2016	Cold Spring Harbor Workshop on Leadership in Bioscience
Nov 2008	SFN Short Course: Optical Control of Neural Excitability
Summer 2005	Cold Spring Harbor Laboratory Biology of Memory Course

HONORS AND AWARDS

Oct 2022	Mangone Young Scholar
Sept 2009	1st place for Graduate Student Systems Research, Johns Hopkins Neuroscience
Feb 2004	2nd place for Graduate Student Research, Texas A&M Neuroscience
Sept 2001	Texas A&M College of Science Biology Fellowship

TEACHING EXPERIENCE

2017-2019	NSCI462(7); Neural Basis of Communication
2017	NSCI320; Introduction to Neuroscience
2015, 2016, 2019-2020	NSCI368; Advance Research in Neuroscience
2015, 2017-2023	PSYC314; Brain and Behavior
2014	PSYC314; Brain and Behavior Honors

INVITED TALKS

Extramural

May 2024	Neural Mechanisms of Acoustic Communication, **Gordon Research Conference**, Newry, Maine
April 2024	Active Olfaction Across Species, **ACHEM Annual Meeting**, Bonita

	Springs, Florida
April 2024	Bodian Seminar, **Johns Hopkins University**, Baltimore, MD
Feb 2024	UTSA Neuroscience Seminar, **University of Texas-San Antonio**, San Antonio, TX
Dec 2023	Neural Circuits of Social and Innate Behavior, **Otto-von-Guericke University**, Magdeburg, Germany
Oct 2023	Dept of Anatomy and Neurobiology Seminar, **Northeast Ohio Medical University**, Rootstown, OH
Oct 2022	Bridging Brains and Bioacoustics Seminar, **Harvard University**, Virtual Meeting
Dec 2021	Swiss Lab Animal Science (SGV) virtual meeting, **University Bern**, Zurich Switzerland
March 2021	Texas A&M Institute for Neuroscience Seminar Series, **Texas A&M University**, College Station, TX
March 2021	Princeton Neuroscience Seminar, **Princeton University**, Princeton, NJ
Dec 2020	Study Group: *Examining Social Behavior in a Time of Social Distancing*, **American College of Neuropsychopharmacology**, Virtual Meeting
Oct 2020	Department of Cellular & Integrative Physiology Seminar Series, **UT Health San Antonio**, San Antonio, TX
May 2020	Neurocircuitry of Social Behavior meeting, **Keystone Symposia**, Daejeon, South Korea **Canceled because of Covid-19 Pandemic**
Oct 2018	Big Data and the Future of Research, Biology and Medicine, **Sigma Xi Annual Meeting**, San Francisco, CA

June 2018 Keynote Speaker for Annual Delaware State University Summer Research Symposium, **Delaware State University**, Dover, DE

March 2018 Nurture Science Program Lecture Series, **Columbia University**, New York, NY

Jan 2018 EEB Seminar Series, **Dept. of Biology-Indiana University**, Bloomington, IN

Oct 2017 Social Communication, **Pavlovian Society**, Philadelphia, PA

April 2017 Stress Neurobiology Seminar Series, **Children's Hospital of Philadelphia**, Philadelphia, PA

Feb 2017 Introductory Research Seminar, **COBRE Monthly Meeting**, Odessa, DE

May 2016 Measuring vocal communication in rodents, **Measuring Behavior**, Dublin, Ireland

March 2015 Stress Neurobiology Seminar Series, **Children's Hospital of Philadelphia**, Philadelphia, PA

March 2014 Behavioral Neuroscience Colloquium, **University of Delaware**, Newark, DE

March 2014 Department of Psychology Seminar, **University of Oregon**, Eugene, OR

Feb 2014 Department of Neuroscience Seminar, **University of Arizona**, Tucson, AZ

April 2012 Bioacoustics and Vocal Communication in Mice, **Pasteur Institute**, Paris, France

Jan 2011 Bodian Seminar, **Johns Hopkins University**, Baltimore, MD

March 2010 Egnor Lab Postdoctoral Talk, **HHMI Janelia Research Campus**, Ashburn, VA

March 2010 Isaac Lab Postdoctoral Talk, **National Institutes of Health**, Bethesda, MD

Intramural

Sept 2022 Interdisciplinary Neuroscience Graduate Program Seminar Series, **University of Delaware**, Newark, DE

Dec 2020 Psychological and Brain Sciences Research Moment, **University of Delaware**, Newark, DE

Dec 2018 COBRE Annual Winter EAC meeting, **University of Delaware**, Newark, DE

June 2016 HPC Symposium, **University of Delaware**, Newark, DE

April 2015 Life Science Research Facility Group, **University of Delaware**, Newark, DE

April 2015 Social Psychology Brown Bag, **University of Delaware**, Newark, DE

April 2014 Psychological and Brain Sciences Research Moment, **University of Delaware**, Newark, DE

PRESS COVERAGE

Feb 2023 “Neunuebel, Perilla Named Mangone Young Scholars”, UDaily
Feb 2020 "Breaking the Communication Code", UDaily
Feb 2020 “The ‘silent’ language of mice is decoded at last”, Nature Research Highlights
Feb 2020 “Cracking the Mouse Communication Code”, Technology Networks
Feb 2020 “Neuroscientist links specific action to specific sounds in mice”, Medical Press
Feb 2020 “Neuroscientist breaks the communication code of mice”, News Medical Life Sciences
Feb 2020 "A.I. translation tool sheds light on the secret language of mice", Digital Trends
Nov 2018 “Pattern of squeaks corresponds to social behavior in autism mice”, Spectrum
Nov 2015 “Female Vocalists Are in the (Mouse) House”, Scientific American
Sept 2015 “Mice Sing Love Songs for Sex”, National Geographic Channel
Sept 2015 “UD study says female mice sing back when courted by males”, Delaware Public Media
Sept 2015 “Female mice croon love songs, too”, Science

Sept 2015	“Songs in the key of mouse”, UDaily
June 2015	“Check mate”, The Naked Scientists
Nov 2012	“Catalog of mice cries aids quest to find their meaning”, SFARI
Nov 2013	“For mice, mating is a dialogue between sexes”, SFARI