

DANIEL A. LLANO, MD, PhD

Professor of Molecular & Integrative Physiology | Neuroscience | Neurology

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www.llanolab.com • [bioRxiv](https://doi.org/10.1101/2023.03.15.531111) • [Google Scholar](https://scholar.google.com/citations?user=K8Y8Y8Y8Y8)

ACADEMIC PROFILE

Physician-scientist with sustained NIH funding, a research program spanning aging and neurodegeneration, auditory circuitry, advanced neuroimaging, and clinical neurology. Experienced academic leader in MD–PhD education, medical and graduate education, interdisciplinary research, and residency training, with complementary Industry experience for neuroscience drug development.

EDUCATION

1992	B.S.	Biology. University of Illinois at Urbana-Champaign, IL (UIUC)
2000	Ph.D.	Molecular and Integrative Physiology. UIUC Thesis: “Information processing in the auditory thalamus of <i>Myotis lucifugus</i> : Implications for temporal pattern recognition.” Advisor: Albert S. Feng, Ph.D.
2002	M.D. (Honors)	University of Illinois at Chicago, External rotations: Internal Medicine (Ramon E. Betances Hospital, Mayaguez, Puerto Rico), Neurology (Mayo Clinic, Rochester, Mn.)

POSTDOCTORAL TRAINING

2002-03	Internship in Internal Medicine, Massachusetts General Hospital/Harvard Medical School.
2003-06	Residency in Neurology, Massachusetts General Hospital/Brigham and Women’s Hospital, Harvard Medical School.
2007	MGH/MIT/HMS Athinoula A. Martinos Center for Biomedical Imaging Visiting Fellowship Program in fMRI
2006-08	Post-doctoral research, Laboratory of Dr. Murray Sherman Fellow, Cognitive and Behavioral Neurology, University of Chicago.

POSITIONS AND EMPLOYMENT

2002-03	Clinical Fellow in Medicine, Harvard Medical School, Boston, MA
2003-06	Clinical Fellow in Neurology, Harvard Medical School, Boston, MA
2006-08	Instructor, Department of Neurology, University of Chicago, Chicago, IL
2008-10	Associate Medical Director, Neuroscience Development, Abbott Laboratories
2010-17	Assistant Professor, Dept of Molecular and Integrative Physiology, UIUC
2010-	Staff Neurologist, Cognitive and Behavioral and Inpatient Neurology Carle Hospital and Carle Neuroscience Institute, Urbana, Illinois
2010-	Full-time faculty member, Beckman Institute for Advanced Science and Technology, UIUC
2017-23	Associate Professor and Benjamin R. and Elinor W. Bullock and Edwin E. and Jeanne Bullock Goldberg Professorial Scholar, Dept of Molecular and Integrative Physiology, Neuroscience, Dept of Biomedical and Translational Sciences, UIUC
2022-	Courtesy appointment, Speech and Hearing Science, UIUC
2023-	Full Professor and Benjamin R. and Elinor W. Bullock and Edwin E. and Jeanne Bullock Goldberg Professorial Scholar, Dept of Molecular and Integrative Physiology, Neuroscience Program, Dept of Biomedical and Translational Sciences, Department of Neurology and Neurosurgery, UIUC
2023-	Co-Director, Intelligent Systems Theme, Beckman Institute

2025-	Director, MD-PhD Program Carle Illinois College of Medicine
2025-	Co-Medical Director, Kiwanis Neuroscience Research Foundation
2026-	Associate Program Director, Carle Hospital Neurology Residency Program

LICENSE AND CERTIFICATION

2003-07	Massachusetts Full Medical License Registration
2006-	Illinois Full Medical License Registration
2021-23	Missouri Full Medical License Registration
2008-	Diplomate, American Board of Psychiatry and Neurology, Certificate #54519, Maintenance of Certification 2018, 2025

HONORS AND AWARDS

1991	Howard Hughes Undergraduate Research Award
1993	Walter Rice Craig Fellow, University of Illinois
1999	Outstanding Thesis Award, Dept of Molecular and Integrative Physiology, UIUC
1999	Dr. P.S. and Kalpagam Ramachandran Research Award
2001	Ross Award for Excellence in Pediatrics
2002	Alpha Omega Alpha, Medical Honor Society
2006	Excellence in Teaching, Harvard Medical School
2011	American Neurological Assn, Invited Symposium Speaker on “Brain and Language.”
2012	Guest editor, <i>Brain and Language</i>
2013	Keynote Speaker, Molecular and Cellular Biology Commencement Ceremonies, UIUC
2015	Golden Apple Teaching Award, University of Illinois College of Medicine
2016	Advances in Medicine Award, Carle Hospital, Urbana, IL.
2017	Helen Corley Petit Scholar, UIUC
2017	Benjamin R. and Elinor W. Bullock and Edwin E. and Jeanne Bullock Goldberg Professorial Scholar
2017	Arnold O. Beckman Research Award, UIUC
2012-19 , '21-24	Excellence in Teaching Recognition, UIUC
2019	Presidential Early Career Award for Scientists and Engineers (PECASE)
2023	LAS Dean’s Distinguished Professorial Scholar
2024	Visiting Professor, Universidad Autónoma de Guadalajara
2026	Section Editor, <i>Hearing Research</i>

TEACHING

1992-00:	Graduate Teaching Assistant: University of Illinois, Urbana-Champaign: Medical Neuroscience, Introduction to Human Physiology, Cellular and Molecular Physiology, Systems and Integrative Physiology, Ecology and Organismic Biology and General Chemistry.
2005	St. Mary of Nazareth Hospital, Chicago, IL. Family practice residency educational lecture, “The neurologic exam.”
2007	University of Chicago, Lecture for neurology residents, “The thalamus.”
2007-11:	University of Chicago undergraduate course: Workings of the Human Brain, “Hearing, language and music.”

2008	University of Chicago, graduate course: Neurobiology of Disease, “Language and aphasia.”
2008	University of Chicago, Lecture for neurology residents “Aphasia prognosis.”
2008	Rush University, Department of Communication Disorders and Sciences, graduate course: Auditory Neuroscience.; “The auditory thalamus.”
2009	University of Chicago, Chicago Academic Medicine Program, “The pathophysiology and treatment of Alzheimer’s Disease.”
2010	University of Chicago, graduate course: Neurotheology: Brain, Mind and Religion. “Attention and transcendental meditation.”
2010	University of Chicago, graduate course: Human Memory. “Pharmacological enhancement of human memory?”
2011	Lecture to Internal Medicine Residency Program, University of Illinois “Non-Alzheimer Dementia”
2011	Lecture to Geriatric Fellowship Program, Carle Hospital “Update on Alzheimer Disease”
2013	“Ethics in Dementia Care,” Carle Hospital Seminar Series.
2014	“Dementia overview: Diagnosis and management,” Carle Hospital Seminar Series.
2012-14:	Course Director and Primary Lecturer, UIUC College of Medicine M1 Step 1 USMLE Review for Medical Neuroscience, UIUC College of Medicine.
2016	“Evaluation of memory loss,” Carle primary care provider lecture, Mattoon, IL.
2004-19:	Falcon/Becker USMLE Reviews Lecturer: Step 1: Physiology, Biostatistics, Pharmacology, Neuroscience, Behavioral Science Step 2: Neurology, Pharmacology
2012-18:	Course director, primary lecturer, Brain, Behavior and Human Development. 30 lectures/year, ~150 students/year Ranked as Excellent by students 2012-2018 (UIUC ICES system).
2012-18:	Lecturer, MCB 493/320, Mechanisms of Human Disease, UIUC “Mechanisms of Neurological Disease.” 6 lectures/year, ~100 students/year Ranked as Excellent by students 2012-2018 (UIUC ICES system).
2015-19:	Lecturer, UIUC College of Medicine M2 Pathophysiology “Movement Disorders” and “Dementia” 2 lectures/year, ~20 students/year
2016-20:	Lecturer, Neuroscience survey course (UIUC NEUR 598) “Translational neuroscience” and “Dementia” 3 lectures/year, ~15 students/year
2017-Current	Course Director, Clinical Neurosciences, Carle Illinois College of Medicine Co-developed curriculum 20-30 lectures/year, ~60 students/year This course does not participate in ICES system
2018-Current	Course Director, Primary lecturer, Neuroscience for Psychiatry Residents, Carle Illinois College of Medicine. 30 lectures/year, ~4-8 students/year

This course does not participate in ICES system

2018-Current Core Faculty, Carle Psychiatry Residency Program

2018-Current Course Director, primary lecturer MCB 314, Introduction to Neurobiology, UIUC
~30 lectures/year, ~150 students/year

Ranked as Excellent by students 2018, 2019, 2021-2024 (UIUC ICES system).

2022-Current Core Faculty, Carle Neurology Residency Program

FUNDING

Current

National Institute on Deafness and Other Communications Disorders

R01DC016599 (Llano, PI) 01/01/21 - 12/31/26

“Synaptic mechanisms of auditory cross-modal communication”

\$250,000/year x 5 years, Direct

National Institute on Deafness and Other Communications Disorders

R01DC013073-01 (Llano, PI) 4/01/2015 – 12/31/28

“Functional organization of the auditory corticocollicular system”

\$ 2,027,247 total/5 years

National Institute on Deafness and Other Communications Disorders

R21DC021605 (Llano, PI) 12/01/2023-11/30/2026

“Novel subdivisions of the dorsal cortex of the inferior colliculus”

\$436,150 total/2 years

Royal National Institute for Deaf People

(Llano, PI) 8/01/2026-7/32/2029

DRG25\22

“Investigation of the relationship between APOE4 expression, hearing loss and Alzheimer Disease pathology”

\$297,831 total/3 years

Kiwanis Neuroscience Research Foundation

(Llano, PI) 7/01/2014 – 6/30/2028

“Seeing phantom sounds: Imaging the neural correlates of tinnitus”

\$20,000/year x 5 years, Direct

Alzheimer’s Association Discovery Grant

(Llano, PI, Song Co-I) 12/01/2023-11/30/2026

“Super-resolution ultrasound to measure vascular pathology in a LOAD model”

\$250,000/3 years, Total

National Institute on Aging

1RF1AG083937-01 09/01/2023-08/31/2026

“Blood-Brain Barrier Permeable Multimodal Imaging Agents for Neurodegenerative Diseases”

(Mirica, PI, Llano, Co-I)

Previous

National Institute of Neurological Disorders and Stroke

1R56NS131516-01 (Llano, PI) 07/15/2023-06/30/2025

“High-resolution cerebral microvascular imaging for characterizing vascular dysfunction in Alzheimer's disease mouse model”

National Institute on Aging

R21 AG077173 (Llano, PI, Song Co-I) 04/2022-03/31/2025

“Super-resolution imaging of brain microvascular changes in a model of Alzheimer Disease”

\$275,000/2 years, Direct

National Institute on Deafness and Other Communications Disorders

R21DC019473 (Llano, PI, Rhodes, Dobrucki, Park Co-I) 04/01/2021-03/31/2024

“Examination of the bidirectional relationship between hearing loss and Alzheimer Disease pathology”

\$275,000/2 years, Direct

National Cancer Institute (NCI)

R01CA241618-01 8/15/2019-7/31/2023

(PI: Tu)

“Imaging tumor microenvironment by optical fiber-tethered simultaneous lifetime-resolved autofluorescence multiharmonic (OFT-SLAM) microscopy”

National Institutes of Mental Health (NIMH)

1R43-MH119979-01 4/15/2019-3/31/2022

(PI: Durack)

“Fiber-delivered programmable supercontinuum laser adaptive to evolving neurophotonic research”

National Institute on Aging

R03AG059103 (Llano, PI) 9/01/2018 - 8/31/2021

Mechanisms of exercise-induced neuroprotection in a mouse model of presbycusis

\$50,000/year x 2 years, Direct

Capita Foundation (Llano, PI)

1/08/2019- 12/31/2019

“An exercise intervention to prevent aging-related hearing loss in a mouse model.”

\$10,000/year x 1 year, Direct

UIUC Campus Research Board

(Llano, PI)

1/01/2017-7/31/2019

“Examination of exercise-induced protection against aging-related hearing loss in a mouse model of presbycusis”

\$29,031/year x 1 year, Direct

National Science Foundation (NSF) Division of Information and Intelligent Systems
1515587 8/16/2015 – 8/15/2018
(Llano, PI, Berger-Wolf, co-PI, Kenyon, co-I)
“CRCNS: Community Dynamic Imaging of Corticothalamic Projections”
\$250,000/year x 3 years, Direct

Carle Neuroscience Institute 6/1/2017 – 5/30/2018
“Strategic Processing Ability in Mild Cognitive Impairment”
(Llano, PI, Mudar co-PI)
\$15,000/year x 1 years, Direct

NIH-Office of Research Infrastructure Programs
S10OD023569-01 (Llano, PI) 3/01/2017 – 2/28/2018
“An upright multiphoton microscope for biomedical research applications”

National Institute on Aging (NIA)
R21-AG054216 02S1 9/15/2017-5/31/2018
(PI: Stine-Morrow)
“Everyday reading, personality and cognitive health in older adults”

National Institutes of Mental Health (NIMH)
R43-MH11221401 4/04/2017-4/03/2018
(PI: Zhao)
“Portable optogenetics/Two-photon imaging instrument for in vivo brain studies”

Center for Nutrition Learning and Memory, UIUC
Grant (PI: Barbey) 6/1/2012 - 5/31/2017
“Nutritional Intake, Cognitive Function, and Measures of Brain Aging”
\$250,000/year x 5 years, Direct

National Institute on Deafness and Other Communications Disorders
R21 DC014765-01 (Llano, PI) 6/23/2015-5/31/2017
“Thalamic reticular nucleus modulation of auditory thalamocortical function”
\$275,000 over two years, Direct

National Institute on Aging (NIA)
L30 AG045918-02 (Llano, PI) 7/01/2015-6/30/2017
“Biomarkers for Subjective Cognitive Impairment”
\$12,000/year x 2 years, Direct

UIUC Campus Research Board
(Llano, PI) 10/06/2015-4/30/2017
“Impact of developmental PCB exposure on synaptic inhibition in the rodent auditory cortex”
\$25,000/year x 1 year, Direct

Beckman Institute Seed Grant
(Llano, Ceman, Sutton, co-PIs) 5/16/2014 - 8/15/2016
“Development of novel optogenetic and brain imaging approaches to study top-down control mechanisms”
\$100,000/year x 2 years, Direct

National Institute on Aging (NIA)
L30 AG045918-01 (Llano, PI) 7/01/2013-6/30/2015
“Biomarkers for Subjective Cognitive Impairment”
\$12,000/year x 2 years, Direct

Center for Health, Aging and Disability, UIUC
Grant (PI: Mudar) 9/1/2012 – 8/31/2013
“Neural Markers of Strategic Learning in Individuals with Subject Memory Impairment”
\$30,000/year x 1 year, Direct

National Institute on Deafness and Other Communications Disorders
1R03DC012125-01 (Llano, PI) 9/26/2011 – 5/31/2015
“Age-Related changes in GABAergic influence on auditory corticothalamic projection.”
\$100,000/year x 3 years, Direct

Alzheimer Association
NIRG-12-242848 (Llano, PI) 9/01/2012 – 8/31/2014
“Diminished cortical GABAergic inhibition in mouse model of Alzheimer Disease”
\$50,000/year x 2 years, Direct

Social Science Brownbag, UIUC 6/01/2013-5/31/2014
(Co-PI, with Matt Dye, Speech/Hearing Science, UIUC)
“iHear: Promoting Hearing Sciences at the University of Illinois”
\$2500/year x 1 year, Direct

American Federation for Aging Research
AFAR 2011-03147 (Llano, PI) 7/01/2011 – 6/30/2013
“Changes in Auditory Cortical Circuitry in Aging: Exploration of the Links between Aging and the Cortical Circuitry of Attention”
\$50,000/year x 2 years, Direct

National Institute on Deafness and Other Communications Disorders
K08 DC008320 (Llano, PI) 6/01/2006-6/01/2008
“Functional Organization of Auditory Corticothalamic Projection Systems.”

Brain Research Foundation Seed Grant 6/01/2007-5/31/2008
(Llano, PI)
“Investigation of attentional modulation via fronto-thalamic networks.”

\$50,000/year x 1 year, Direct

National Institute on Deafness and Other Communications Disorders

L30 DC009286-01 (Llano, PI) 7/01/2007-6/30/2009

“Development of an Aphasia Database”

As Primary or Secondary Mentor

T32 Environmental Toxicology Training Grant

(PI: Vaithiyalingam Chandra Sekaran) 9/1/2023-8/31/2025

“Developmental PCB exposure effect on inferior colliculus microvasculature”

National Institute on Neurological Disorders and Stroke (NINDS)

Individual Predoctoral Fellowship (National Research Service Award)

F31 NS124306

(PI: Ingram, Primary mentor: Christian) 2/01/2022 – 1/31/2023

“Epilepsy-Associated Dysfunction in the Kisspeptin-GnRH Neural Circuit”

\$46,036/year

T32 Environmental Toxicology Training Grant

(PI: Ibrahim) 9/1/2021-8/31/2023

“Developmental PCB exposure effect multiphoton imaging measures of inferior colliculus”

Beckman Postdoctoral Fellows Award 9/1/2021-8/31/2023

(PI: Vaithiyalingam Chandra Sekaran)

“Aging and Alzheimer’s disease effects on neurovasculature measured by ultrasound”

\$50,000/year x 2 years, Direct

National Institute on Aging (NIA)

Individual Predoctoral NRSA for M.D./Ph.D. Fellowships

F30 AG055283-01 (PI: Cerjanic, Primary mentor: Sutton) 9/15/2017 – 9/15/2020

“Developing quantitative biomarkers for monitoring longitudinal changes in brain microvascular health”

\$30,000/year x 3 years, Direct

National Institute on Deafness and Other Communications Disorders (NIDCD)

Individual Predoctoral Fellowship (National Research Service Award)

F31 DC 015967-01 (PI: Lesicko) 1/01/2017 – 12/31/2019

“Functional modularity and multisensory convergence in the lateral cortex of the mouse inferior colliculus”

\$30,000/year x 3 years, Direct

Beckman Graduate Fellows Award 8/16/2016-8/15/2017

(PI: Stebbings, co-mentor: Justin Rhodes, Psychology, UIUC)

“Redox mechanisms of exercise-induced rescue of decline in neural function with aging”

\$30,000/year x 1 year, Direct

National Institute on Deafness and Other Communications Disorders (NIDCD)

Individual Predoctoral Fellowship (National Research Service Award)

F31 DC013501-01

9/1/2013-8/31/2016

(PI: Slater, co-mentor: Lee Cox, UIUC)

“The role of the thalamic reticular nucleus in temporal processing in the medial geniculate body”

\$30,000/year x 3 years, Direct

Beckman Postdoctoral Fellows Award 9/1/2013-8/31/2015

(PI: Sadowski, Primary mentor: Susan Schantz, Comparative Biosciences, UIUC)

“Effects of developmental PCB exposure on activation of the adult auditory cortex and hippocampus”

\$50,000/year x 2 years, Direct

Beckman Graduate Fellows Award 8/16/2013-8/15/2014

(PI: Slater, co-mentors: Matt Dye, Speech/Hearing Science and Brad Sutton, Biomedical Eng., UIUC)

Declined since another award was in place

“The impact of hearing loss on cross-modal plasticity: An interdisciplinary investigation using optogenetic approaches in a novel in vitro system”

\$30,000/year x 1 year, Direct

As Trainee

F32DC008215 NIDCD

07/01/2006 - 07/02/2006

“Auditory corticothalamic projection systems”

Awarded and declined in lieu of K08 award.

Systems and Integrative Physiology Predoctoral Training Grant

NRSA T32

8/01/1995-7/31/1998

“Neural correlates of fluttering target detection in the echolocating bat”

Sensory Neuroscience Training Grant

PEER-REVIEWED PUBLICATIONS

1. **Llano D.A.** and Ramirez V.D. (1994) Isolation of DARP (dopamine-releasing protein) from fetal rat brain and effects of DARP immunoneutralization on fetal mesencephalic dopamine levels. *Molecular and Cellular Neuroscience*. Dec;5(6):649-57.
2. **Llano D.A.** and Feng A.S. (1999) Response characteristics of neurons in the medial geniculate body of the little brown bat to simple and temporally-patterned sounds. *Journal of Comparative Physiology [A]*. 184: 371-385.
3. Galazyuk A.V., **Llano D.** and A.S. Feng (2000) Temporal dynamics of acoustic stimuli enhance amplitude tuning of inferior colliculus neurons. *Journal of Neurophysiology*. Jan;83(1):128-38.
4. **Llano D.A.** and A.S. Feng (2000) Computational models of temporal processing in the auditory thalamus. *Biological Cybernetics*. 83: 419-433.
5. **Llano D.A.** and R.S. Abernethy (2004) Severe depression, obsessive-compulsive disorder, and pulmonary embolism. (case report) *Psychosomatics*. Jul-Aug;45(4):364-5.

6. Galazyuk A.V., Lin W., **Llano D.** and A.S. Feng. (2005) Leading inhibition and oscillation in time-domain processing in the auditory midbrain. *Journal of Neurophysiology*. Jul;94(1):314-26.
7. **Llano D.A.** and S.M. Sherman (2008) Evidence for non-reciprocal organization of the mouse auditory thalamocortical-corticothalamic projection systems. *Journal of Comparative Neurology*. 507:1209-1227.
8. **Llano D.A.**, Theyel B.B., Mallik A., Sherman S.M. and N.P. Issa (2009) Rapid and sensitive mapping of long range connections in vitro using flavoprotein autofluorescence imaging combined with laser photostimulation. *Journal of Neurophysiology*. 101(6):3325-40
9. **Llano D.A.** and S.M. Sherman (2009) Differences in intrinsic properties and local network connectivity of identified layer 5 and layer 6 adult mouse auditory corticothalamic neurons support a dual corticothalamic projection hypothesis. *Cerebral Cortex*. Dec;19(12):2810-26.
10. Small S.L. and **Llano D.A.** (2009) Biological therapy for aphasia. (Invited review) *Current Neurology and Neuroscience Reports*. Nov;9(6):443-50.
11. Lu E., **Llano D.A.** and S. M. Sherman. (2009) Different distributions of calbindin and calretinin immunostaining across the medial and dorsal divisions of the mouse medial geniculate body. *Hearing Research*. Nov;257(1-2):16-23.
12. Theyel B.B., **Llano D.A.** and S. M. Sherman. (2010) Evidence for a cortico-thalamocortical pathway for cortical communication. *Nature Neuroscience*. 13(1):84-8.
13. Luo F., Seifert T., Roesner B., Hradil V., Hillen H., Ebert U., Day M., **Llano D.A.**, Rustay N.R. and G.B. Fox. (2010) MRI detection and time course of cerebral microhemorrhages during A β antibody treatment in living APP transgenic mice. *Journal of Pharmacology and Experimental Therapeutics*. Dec;335(3):580-8.
14. **Llano D.A.**, Laforet, G. and V. Devanarayan (2011) Derivation of a new ADAS-cog composite using tree-based multivariate analysis: Prediction of conversion from mild cognitive impairment to Alzheimer's disease. *Alzheimer's Disease and Associated Disorders*. Jan-Mar;25(1):73-84.
15. Chin C-L, Carr R.A., **Llano D.A.**, Barret O., Xu H., Marsh K.C., Tamagnan G., Decker M.W., Day M., and G.B. Fox. (2011) Displacement of [123I]-5IA-85380 Binding in baboons by the nicotinic 42 receptor partial agonist ABT-089 - Implications of dosing regimens. *Journal of Pharmacology and Experimental Therapeutics*. Mar;336(3):716-23.
16. Theyel B.B., **Llano D.A.**, Issa N., Mallik A. and S. M. Sherman. (2011) Laser photostimulation with flavoprotein autofluorescence imaging in vitro. *Nature Protocols*. Apr;6(4):502-8.
17. Luo F. Rustay N., Ebert U., Hradil V., Cole, T., **Llano, D.A.**, Mudd, S., Zhang, Y. and G.B. Fox (2012) Characterization of 7 and 19 month old Tg2576 mice using multimodal in-vivo imaging: Limitations as a translatable model of brain glucose metabolism in Alzheimer's disease. *Neurobiology of Aging*. May;33(5):933-44.
18. Li J., **Llano D.A.**, Ellis T., LeBlond D., Lenz R. and J. F. Waring. (2012) Effect of CSF draw frequency on A levels in human subjects. *Alzheimer's and Dementia*. Jul;8(4):295-303.
19. **Llano D.A.**, Li J., Lenz R.A., Ellis T., Cassar S., Groebe D., Gopalakrishnan M. and J.F. Waring (2012) Cerebrospinal fluid cytokine dynamics differ between Alzheimer disease patients and elderly controls. *Alzheimer's Disease and Associated Disorders* Oct;26(4):322-8.
20. Yang S., Yang S., Cox C.L., **Llano D.A.** and Feng A.S. (2012) Cell's intrinsic biophysical properties play a role in the systematic decrease in time-locking ability of central auditory neurons. *Neuroscience*. 2012 Apr 19;208:49-57.
21. **Llano D.A.**, Caspary D. and J. Turner (2012) Diminished cortical inhibition in an aging mouse model of chronic tinnitus. *Journal of Neuroscience* Nov 14;32(46):16141-8.
22. **Llano D.A.**, Simon A. and V. Devanarayan (2013) Evaluation of plasma proteomic data for Alzheimer's Disease state classification and for prediction of progression from mild cognitive impairment to Alzheimer Disease. *Alzheimer Disease and Associated Disorders* Jul- Sep;27(3):233-43.
23. **Llano D.A.** (2013) Functional imaging of the thalamus in language. (review) *Brain and Language*. Jul;126(1):62-72.

24. Hasadsri L., Wang B.H., Lee J.V., Erdman J.W., **Llano D.A.**, Barbey A.K., Wszalek T., Sharrock M.F. and H. Wang (2013) Omega-3 fatty acids for treatment of traumatic brain injury. (review) *Journal of Neurotrauma*. 2013 Jun 1;30 (11):897-906.
25. Slater B.J., Willis A.M and **D.A. Llano** (2013) Evidence for layer-specific differences in auditory corticocollicular neurons. *Neuroscience*. Jan 15;229:144-54.
26. **Llano D.A.** (2013) Voices below the surface: A role for the thalamus in language? *Brain and Language*. Jul;126(1):20-1.
27. **Llano D.A.**, Slater B.J., Lesicko A.M. and K.A. Stebbings (2014) An auditory colliculo- thalamocortical brain slice preparation in mouse. *Journal of Neurophysiology*, Jan;111(1):197- 207.
28. Hasson U., **Llano D. A.**, Miceli G. and A.S. Dick (2014) Does it talk the talk? On the role of basal ganglia in emotive speech processing. *Behavioral and Brain Sciences*, Dec;37(6):556-7.
29. Stebbings K.A., Lesicko A.M.H. and **D.A. Llano** (2014) The auditory corticocollicular system: Molecular and circuit-level considerations. (review) *Hearing Research*, Aug;314C:51-59.
30. Wang H., Wang B., Normoyle K., Jackson K., Spitler K., Sharrock M.F., Miller C., Best C., **Llano D.** and R. Du (2014) Brain temperature and its fundamental properties: A review for clinical neuroscientists (review) *Frontiers in Neuroscience*, Oct 8;8:307.
31. Lenz R.A., Pritchett Y., Berry S.M., **Llano D.A.**, Han S., Berry D.A., Sadowsky D.A., Abi-Saab W.M. and M.D. Saltarelli (2015) Adaptive, dose-finding phase 2 trial evaluating the safety and efficacy of ABT-089 in mild-to-moderate Alzheimer's Disease. *Alzheimer Disease & Associated Disorders*, Jul-Sep;29(3):192-9.
32. Wang, H, Wang, B, Jackson, K, Miller CM, Hasadsri L, **Llano D**, Rubin R, Zimmerman J, Johnson C and B. Sutton (2015) A novel head-neck cooling device for concussion injury in contact sports. *Translational Neuroscience*, Volume 6, Issue 1, p20-31.
33. Slater B.J., Fan A., Stebbings K.A., Saif T., **Llano D.A.** (2015) Modification of a colliculo- thalamocortical mouse brain slice, incorporating 3-D printing of chamber components and multi- scale optical imaging. *Journal of Visualized Exp*, Sep 18;(103).
34. Fan, A, Stebbings KA, **Llano DA** and T Saif (2015) Stretch Induced Hyperexcitability of Mice Callosal Pathway. *Frontiers in Cellular Neuroscience*, Aug 5;9:292.
35. Normoyle K.P., Kim M., Farahvar A., **Llano D.** and H. Wang (2015) The emerging neuroprotective role of mitochondrial UCP2 in TBI *translational neuroscience*. (review) *Translational Neuroscience*, 6(1), 179-186.
36. Willis A.M., Slater B.J., Gribkova E. and **D.A. Llano** (2015) Open-loop organization of thalamic reticular nucleus and dorsal thalamus: A computational model. *Journal of Neurophysiology* Oct;114(4):2353-67.
37. Ma C., Forbes A.G., **Llano D.A.**, Berger-Wolf T. and R.V. Kenyon (2016) SwordPlots: Exploring neuron behavior within dynamic communities of brain networks. *Journal of Imaging Science and Technology*. Volume 60, Number 1, pp. 10405-1-10405-13(13).
38. Stebbings K.A., Choi H.W., Ravindra A., Caspary D.M., Turner J.G. and **D.A. Llano** (2016) Aging-related changes in GABAergic inhibition in the mouse auditory cortex, measured using in vitro flavoprotein autofluorescence imaging. *Journal of Physiology*. Jan 1;594(1):207-21.
39. Wang H., Kim M., Normoyle K.P. and **D. Llano** (2016) Thermal regulation of the brain – an anatomical and physiological review for clinical neuroscientists. (review) *Frontiers in Neuroscience*, Jan 21;9:528.
40. Stebbings K.A., Choi H.W., Ravindra A., and **D. A. Llano** (2016) The impact of aging, hearing loss and body weight on mouse hippocampal redox state, measured in brain slices using fluorescence imaging. *Neurobiology of Aging*, Jun;42:101-9.

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61. Zhao Y, Maguluri G, Ferguson RD, Tu H, Paul K, Boppart SA, **Llano DA**, Iftimia N (2020) Two-photon microscope using a fiber-based approach for supercontinuum generation and light delivery to a small-footprint optical head. *Optics Letters*. Feb 15;45(4):909-912.
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66. Nadhimi, Y. and **D.A. Llano** (2020) Does hearing loss lead to dementia? A review of the literature (Review). *Hearing Research*, Jul 30:108038.
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100. Issa LK, Vaithiyalingam Chandra Sekaran N, **DA Llano** (2023) Highly branched and complementary distributions of layer 5 and layer 6 auditory corticofugal axons in mouse *Cerebral Cortex*, Jun 29:bhad227.
101. Devanarayan V, Ye Y, Charil A, Andreozzi E, Sachdev P, **Llano DA**, Tian L, Zhu L, Hampel H, Kramer L, Dhadda S, Irizarry M; Alzheimer's Disease Neuroimaging Initiative (ADNI). Predicting clinical progression trajectories of early Alzheimer's disease patients. *Alzheimers Dement*. 2024 Mar;20(3):1725-1738.
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103. Devanarayan V, **Llano DA**, Hu YH, Hampel H, Kramer L, Dhadda S, Irizarry M. (2024) Plasma pTau181 enhances the prediction of future clinical decline in amyloid-positive mild cognitive impairment. *Alzheimers Dement (Amst)*. Jul 23;16(3):e12621.
104. Devanarayan V, Doherty T, Charil A, Sachdev P, Ye Y, Murali LK, **Llano DA**, Zhou J, Reyderman L, Hampel H, Kramer LD, Dhadda S, Irizarry MC. (2024) Plasma pTau217 predicts continuous brain amyloid levels in preclinical and early Alzheimer's disease. *Alzheimers Dement*. 2024 Aug;20(8):5617-5628.
105. Lowerison MR, Vaithiyalingam Chandra Sekaran N, Dong Z, Chen X, You Q, **Llano DA**, Song P. Super-Resolution Ultrasound Reveals Cerebrovascular Impairment in a Mouse Model of Alzheimer's Disease. (2024) *J Neurosci*. Feb 28;44(9):e1251232024.
106. Lin BZ, Changyu Fan A, Wang Y, Lowerison M, Dong Z, You Q, Vaithiyalingam Chandra Sekaran N, **Llano DA**, Borden MA, Song P (2025) Combined Nanodrops Imaging and Ultrasound Localization Microscopy for Detecting Intracerebral Hemorrhage. *Ultrasound in Medicine & Biology*, Apr;51(4):707-714
107. Wang Y, Lowerison MR, You Q, Lin BZ, **Llano DA**, Song P. (2025) Longitudinal Awake Imaging of Deep Mouse Brain Microvasculature with Super-resolution Ultrasound Localization Microscopy. *eLife*, Nov 6;13:RP95168.

108. Ibrahim BA, Shinagawa Y, Xiao G, Asilador AR, **DA Llano** (2025) Microprism-based two-photon imaging of the lateral cortex of the mouse inferior colliculus reveals novel organizational principles of the auditory midbrain. *eLife*, Mar 14;12:RP93063.
109. Singh S, **Llano DA** (2025) Differential myeloarchitecture of subfields of the mammalian auditory cortex: A comparative approach. *Brain Behav Evol.* Dec 8:1-22.
110. Alammam H, Diallo M, **Llano DA.** (2025) Multiple ischemic strokes in a patient treated with Lecanemab: a case report. *Neurocase.* Dec;31(6):295-300.
111. Sekaran NVC, Schantz SL, **Llano DA.** (2025) Effects of polychlorinated biphenyls on the peripheral and central auditory systems. *Hear Res.* 2025 Nov;467:109442.
112. Alammam H, Moreno A, Wissinger L, **Llano DA.** (2026) Atypical Initial Manifestation of Sporadic Creutzfeldt-Jakob Disease as Progressive Aphasia and Palinopsia: A Case Report. *Cogn Behav Neurol.* 2026 Apr 16.
113. Ibrahim BA, **Llano DA.** (2026) A Protocol for microprism-based two-photon imaging of the lateral cortex in the mouse inferior colliculus. *Curr Protoc.* 2026 Jan;6(1):e70286.

BOOK CHAPTERS

1. Varela, C., **Llano D.A.** and B.B. Theyel. (2012) “Brain slice electrophysiology.” In Neuronal Network Analysis, Fellin T, Halassa M, eds. Springer Publishers.
2. **Llano D.A.** (2015) “Thalamus and Language” In The Neurobiology of Language. Small S. and Hickok G. eds. Elsevier Publishers.
3. **Llano D.A.** and Small S. L. (2015) “Pharmacotherapy for Aphasia” In The Neurobiology of Language. Small S. and Hickok G. eds. Elsevier Publishers.
4. Small S.L. and **Llano D.A.** (2015) “Biological Approaches to Treatment of Aphasia” In Handbook on Adult Language Disorders, Hillis A., eds. Taylor & Francis Publishers.
5. Huynh, N, Lee C.M., Ibrahim B.A., Key M.N. and **Llano D.A.** (2019) “Injections of viral optogenetic tracers into the cerebral cortex of neonatal mouse” In Neuromethods: Basic Neurobiology Techniques. Wright N. ed. Springer Publishers.
6. Yudintsev G., Lee C.M., Asilador A. and **Llano D.A.** (2019) “Transcranial imaging of the mouse auditory cortex in the GCaMP6 mouse” In Neuromethods: Basic Neurobiology Techniques. Wright N. ed. Springer Publishers.
7. Caspary D.M. and **Llano D.A.** (2019) “The aging auditory brainstem” in Neuroscience Handbook Series: The Auditory Brainstem: Organization, Function, and Plasticity, Kandler, K. ed. Oxford Press.
8. MacLaine K.D. and **Llano D.A.** (2020) “The aging central auditory system” in The Senses - Vol.II Audition, Grothe, B. ed. Elsevier Press.
9. Singh M and **Llano D.A.** (2023) “Drugs for Neurodegenerative Dementias” in An Introduction to Basic and Clinical Pharmacology, Uteshev, Shadiak, Llano eds. Cambridge Scholars Press.
10. **Llano D.A.** (2023) “Ataxia, Dizziness and Balance Problems” in An Introduction to Basic and Clinical Pharmacology, Uteshev, Shadiak, Llano eds. Cambridge Scholars Press.
11. **Llano DA** (2023) “Auditory thalamic nuclei, cell types and parallel pathways” in The Cerebral Cortex and Thalamus. Sherman and Usrey ed. Oxford University Press.

CONFERENCE PROCEEDINGS

1. Ma C., Kenyon R.F., Forbes A., Berger-Wolf T., Slater B.J. and **D.A. Llano** (2015) Visualizing dynamic brain networks using an animated dual-representation. *Eurographics Conference on Visualization (EuroVis)*, May 25-29.

2. Patel M. B., Sons S., Yang L., Taha G.A., Lesicko A.M.H., Yudintsev, G. and **D.A. Llano** (2015). The thalamotectal system: An ancient projection for modulating the auditory midbrain. *Proceedings of Meetings on Acoustics*, 25(1).
3. Lowerison, M; Chen, X; Huang, C; Zhang, W; Tang, S; Sekaran, N; **Llano, D**; Chen, S; Song, P. Multi-resolution Data Processing for Accelerated and Robust Ultrasound Localization Microscopy (2020) *IEEE International Ultrasonics Symposium (IUS)*. 2020, p.1-4
4. Kim, J., Dong, Z., Lowerison, M.R., Sekaran, N.V.C., You, Q., **Llano, D.A.** and Song, P., 2022, October. Deep Learning-based 3D Beamforming on a 2D Row Column Addressing (RCA) Array for 3D Super-resolution Ultrasound Localization Microscopy. In *2022 IEEE International Ultrasonics Symposium (IUS)* (pp. 1-4). IEEE.
5. Shin, Y., Lowerison, M.R., Dong, Z., Chen, X., You, Q., ChandraSekaran, N.V., **Llano, D.A.**, Anastasio, M. and Song, P., 2022. Deep learning-based fast and dense microbubble localization for ultrasound localization microscopy. *The Journal of the Acoustical Society of America*, 152(4), pp.A112-A112.

INVITED LECTURES

2002 Ramon E. Betances Hospital, Department of Medicine, Mayaguez, PR

“tPA en accidente cerebrovascular agudo”

2006 Massachusetts General Hospital/Brigham and Women’s Hospital Resident Conference,

“The role of the thalamus in cortical function.”

2007 University of Chicago Neurology Grand Rounds,

“The role of the thalamus in cortico-cortical communication.”

2007 University of Chicago Neuroscience Roundtable,

“Proposal for fMRI investigation of the role of the thalamus in attention.”

2009 Abbott Neuroscience Grand Rounds,

“The use of biomarkers in Alzheimer’s Disease drug development.”

2010 New Faculty Talk, Cell and Molecular Biology & Molecular Biophysics Training Grants - 23rd Annual Research Symposium, UIUC. “A role for the thalamus in cortical function.”

2010 UIUC Neuroscience Program Colloquia Talk

“A role for the thalamus in cortical function.”

2010 Southern Illinois University, Department of Pharmacology

“A role for the thalamus in auditory cortical function.”

2011 Grand Rounds, Department of Medicine, Carle Hospital

“Management of Behavioral Symptoms of Alzheimer Disease”

2011 American Neurological Association, Symposium Speaker

“The role of the thalamus in language”

2011 Northeast Ohio University College of Medicine, Department of Anatomy and Neurobiology.

“A role for the thalamus in auditory cortical function.”

2012 Ear Day Symposium at Rush University, Chicago, IL.

“Studies on the mouse auditory forebrain in normal and pathological states”

2013 UIUC, Department of Molecular/Integrative Physiology Seminar

“Studies on mouse auditory forebrain processing”

2013 UIUC, Department of Psychology Brownbag Seminar

“Sounds from the deep: Studies of auditory subcortical processing”

2013 University of Iowa, Department of Neurosurgery Seminar

“Flavoprotein imaging as a potential tool in functional neurosurgery”

2013 Ear Day Symposium at Rush University, Chicago, IL.

“Sounds from the deep: Insights on subcortical auditory processing”

2013 University of Wisconsin-Madison. Bioengineering Imaging Seminar

“Top-down modulation of auditory processing in the mouse midbrain and thalamus.”

2014 Illiana Alzheimer Disease Conference, Covington, IN

“MCI and Early Alzheimer’s: Screening, Assessment and Intervention”

2014 Kiwanis Club Annual Meeting, Bloomington, IL

“Seeing phantom sounds: Imaging the neural correlates of tinnitus”

2014 Purdue University, Biological Sciences Seminar

“Sounds from the deep: New insights on auditory subcortical processing”

2014 Ear Day, Rush University

“Bottom up meets top-down: Studies of auditory corticofugal projections”

2015 Illiana Alzheimer Disease Conference, Urbana, IL

“New therapies for mild cognitive impairment and Alzheimer disease”

2015 Illinois Summer Neuroscience Institute, Distinguished Lecture

“Mechanisms of top-down auditory control”

2015 Acoustic Society for America, semi-annual meeting

“Frogs, thalamotectal neurons and other things I learned about from Al Feng”

2015 Ear Day Symposium at Rush University, Chicago, IL.

“The thalamotectal system: an ancient projection for modulating the auditory midbrain”

2016 Synapse: A Collaborative Neuroscience Symposium, Beckman Institute, Urbana, IL

“What’s new in the treatment of Alzheimer’s Disease?”

2016 Molecular and Integrative Physiology Seminar, UIUC

“Bottom up meets top-down: Modulation in the auditory system”

2016 Department of Cancer Biology and Pharmacology, University of Illinois at Peoria

“Top-down modulation in the mouse auditory system”

2016 University of Wisconsin-Madison, “Brain and Bagels” seminar series

“Descending projections in the mouse auditory system”

2017 Carle Brain Injury Symposium

“Vascular Dementia: An Update”

2017 Clinical and Translational Neuroscience Workshop
Interdisciplinary Health Sciences Initiative, UIUC
“Maladaptive auditory cortical network changes associated with aging and hearing loss”

2017 The Bullock-Goldberg Award Inaugural Seminar, UIUC
“Voices down below: cortical-subcortical interactions in the mouse auditory system”

2017 Illinois State University, Department of Physics Colloquium Series
“Neurophysiology of the auditory system: Cortical-subcortical interactions”

2018 University of Illinois Internal Medicine Grand Rounds
“Update on Dementia”

2018 7th Biennial Regional Conference. Alzheimer’s Disease: Challenges and Choices
“Alzheimer’s Update: Research and Practice”

2018 Synapse: Frontiers of Stroke Management
“tPA use in stroke mimics”

2018 ZNI Seminar Series, University of Southern California
“Parallel pathways in the auditory corticocollicular system”

2019 University of Illinois Neuroscience Program Seminar
“Is amyloid responsible for Alzheimer Disease” (A debate along with Dr. Stephanie Ceman)

2019 UTSA Neurobiology Seminar Series (invited, could not attend)
“Sounds from the deep: Cortical modulation of auditory subcortical function in the mouse”

2020 Univ of Michigan, Kresge Hearing Research Institute
“Echoes from below: Examination of cortico-tectal interactions in the mouse auditory system.”

2021 Carle Illinois College of Medicine Innovation Grand Rounds:
“Is perception just a controlled hallucination? Evidence from the thalamocortical system”

2022 Carle Bioethics Series
“Bioethics in Dementia”

2022 Department of Pharmacology, SIU School of Medicine
“Mice, modules and modulation: Examination of a major descending projection in the auditory system.”

2022 Department of Neurology Grand Rounds, SIU School of Medicine
“Hearing loss and dementia – what’s the connection?”

2022 Colloquium Seminar Series, Department of Biological Sciences, Lehigh University
“Potential roles of the thalamic reticular nucleus in controlling cortical activation”

2023 Institute of Neuroscience, University of Oregon
“Sounds from the deep: Corticocollicular interactions in the mouse”

2023 Pittsburgh Hearing Research Center seminar:
“Of mice and modules: Cortex-midbrain interactions in the auditory system”

2023 Rutgers/RWJMS Brain Health Institute/Dept Otolaryngology

“Sounds from the deep: Functional interactions in the auditory corticocollicular system”

2023 Virginia Tech University Innovator Seminar Series:

“Sounds from the deep: Corticocollicular interactions in the mouse”

2024 Stanford University, Molecular and Cellular Physiology:

“Sounds from the deep: Corticocollicular interactions in the mouse”

2024 Universidad de Salamanca, Instituto de Neurociencias de Castilla y León:

“Sounds from the deep: Corticocollicular interactions in the mouse”

2025 SUNY Stony Brook: Department of Neurobiology and Behavior

“Sounds from the deep: Corticocollicular interactions in the mouse”

2025 Harvard Medical School/Mass Eye and Ear Infirmary:

“Sounds from the deep: Corticocollicular interactions in the mouse”

2026 Chicago State University, Dr. Julian Sheinbuks Annual Lecture:

“Sounds from the deep: How the auditory system reaches into its past to help us to hear”

2026 U Texas at San Antonio, Department of Neuroscience, Developmental and Regenerative Biology:

“Sounds from the deep: Corticocollicular interactions in the mouse”

AD HOC JOURNAL REVIEWER (since 2010)

Austin Journal of Clinical Neurology, BMJ Open, Brain and Behavior, Brain and Cognition, Brain and Language, Brain Imaging and Behavior, Brain Research, Cell Reports, Cerebral Cortex, Clinical Interventions in Aging, Ear and Hearing, ELife, European Journal of Neuroscience, Frontiers in Auditory Cognitive Neuroscience, Frontiers in Computational Neuroscience, Frontiers in Human Neuroscience, Frontiers in Neural Circuits, Frontiers in Neuroanatomy, Frontiers in Systems Neuroscience, Hearing Research, IEEE Transactions on Neural Systems and Rehabilitation Engineering, Journal of Comparative Physiology, Journal of Neurophysiology, Journal of Neuroscience, Journal of Neuroscience and Neurological Disorders, Journal of Neuroscience Methods, Journal of Neurotrauma, Journal of the Neurological Sciences, Journal of Visualized Experiments, Language and Cognition, Nature Communications, Neurobiology of Aging, Neurobiology of Disease, Neuroscience, Neuroscience Letters, Neuroscience Research, Noise and Health, Nutritional Neuroscience, Pain, Pediatric Investigation, PLOS Biology, PLOS One. Proceedings of the National Academy of Sciences, Rejuvenation Research, Scientific Reports, Synapse, The Neuroscientist, Trends in Neuroscience

GRANT REVIEWER

2011 Alzheimer Association International Grant Program Reviewer

2012 Invited Panelist, NSF Division of Mathematical Sciences/NIGMS Review Board

2014 Action on Hearing Loss, International Grant Program Reviewer

2014 Neurological Foundation of New Zealand Grant Reviewer

2015 Health Research Council of New Zealand Grant Reviewer

2015 University of Illinois Research Board

2016 Wellcome Trust Senior Research Fellowship in Basic Biomedical Science, UK

2016 Agir Pour L'Audition Foundation, France

2016 Medical Research Council Review, UK

2016 Neural Systems, NSF (invited, could not attend)

2016 AUD Study Section, ad hoc

2017 Panelist, NSF Collaborative Research in Computational Neuroscience/Information & Intelligent Systems Division Review

2017 Neurological Foundation of New Zealand

2017 French National Research Agency (ANR)

2017 Tinnitus Review Panel for Peer Reviewed Medical Research Program (PRMRP) for the Department of Defense Congressionally Directed Medical Research Programs (CDMRP)

2017 NSF, Division of Behavioral and Cognitive Sciences-Cogneuro

2018 AUD Study Section, ad hoc

2018 Medical Research Council Review, UK

2018 Czech Science Foundation

2019 ZDC1 SRB-X (67) - NIDCD Hearing and Balance Fellowship Review, ad hoc NIH

2019 ZDC1 SRB-Y (56) - NIDCD Hearing and Balance Fellowship Review, ad hoc NIH

2019 NSF EPSCoR Research Fellows Program, ad hoc reviewer

2019 NIH Special Emphasis Panel (Alzheimer Disease – asked – unable to serve)

2019 Action on Hearing Loss

2020 NIH program project review

2021 AUD Study Section, ad hoc

2021 University of Michigan's Claude Pepper Older Americans Independence Center Pilot Grant

2021 Royal National Institute for Deaf People (RNID) Discovery research grant reviewer

2022 LRP NIDCD Review Panelist

2022-2026 Invited member, AUD Study Section, CSR, (term = 2022-2026)

2022, 2026 RNID Discovery Research Grant

2023 La Caixa Research Foundation

2024 UK Research and Innovation Funding Service

2025 NSF Collaborative Research in Computational Neuroscience Panel