# Curriculum vitae

## *PERSONAL DATA*


| | |
|---|---|
| Name: | **ALFONSO ARAQUE** |
| Place of birth: | Madrid. |
| Citizenship: | Spain |
| Place of work: | 3-160 Jackson Hall<br>321 Church Street SE<br>Minneapolis, MN 55455 |
| Phone: | 612 624 0901 |
| E-mail: | araque@umn.edu |


## *ACADEMIC DEGREES*

**Graduate** in Biological Sciences. Universidad Complutense de Madrid. June, 1988.
**Doctor** in Biological Sciences. Universidad Complutense de Madrid. July, 1993.

## *PRESENT POSITION*

**Professor.** Department of Neuroscience. University of Minnesota.

## *PREVIOUS RESEARCH ACTIVITY AND POSITIONS*

| | |
|---|---|
| 1989-92 | Predoctoral fellow. Cajal Institute, CSIC, Madrid, Spain. Supervisor: W. Buño. |
| Oct 1990 | Visiting fellow. CNRS, Marseille, France. Supervisor: F. Clarac |
| Dec 1991 | Visiting fellow. CNRS, Marseille, France. Supervisor: F. Clarac |
| June 1992 | Visiting fellow. CNRS, Marseille, France. Supervisor: F. Clarac |
| 1993-95 | Areces Foundation Postdoctoral fellow. Cajal Institute, CSIC, Madrid, Spain. Supervisor: W. Buño. |
| 1996 | NATO Postdoctoral fellow. Iowa State University, USA. Supervisor: P.G. Haydon. |
| 1997-98 | HFSP Postdoctoral fellow. Iowa State University, USA. Supervisor: P.G. Haydon. |
| 1998-99 | Research Associate. Iowa State University, USA. |
| 1999-01 | Researcher. Cajal Institute, CSIC, Madrid, Spain. |
| 2001-06 | Staff scientist. Cajal Institute, CSIC, Madrid, Spain. |
| 2006-07 | Research scientist. Cajal Institute, CSIC, Madrid, Spain. |
| 2008-13 | Research Full Professor, CSIC. Instituto Cajal, CSIC, Madrid, Spain. |
| 2013- | Professor. Department of Neuroscience. University of Minnesota. |

## *DISTINCTIONS and AWARDS*

Inductee, **Academy for Excellence in Health Science Research (2020)**
**Vice-President** of the Spanish Society for Neuroscience (2011-2013).
**Treasurer** of the Spanish Society for Neuroscience (2009-2011).
**President** of the Spanish Glia Network (2013-2020)
**Member of Academia Europaea** (2010).
**Invited Plenary Lecture**. XIII Spanish Society for Neuroscience meeting (2009).
**Pfizer Foundation Award** (2008).

**Scientific Highlight of the year** (2007). Selected by FENS & SENC.
**Invited Lectures**: 115 in International Universities and Research Centers.
**Invited Foreign Expert** to annual meeting of DFG Priority Program, Germany (2005).

## *RESEARCH GRANTS* (as Principal Investigator or Co-Principal Investigator)

| | |
|---|---|
| 2002-04 | Ministry of Science and Technology, BFI2001-0206, Spain. 89 851 €. |
| 2005-07 | Ministry of Education and Science, BFU2004-00448, Spain. 244 050 €. |
| 2008-10 | Ministry of Science and Innovation, BFU2007-64764, Spain. 300 000 €. |
| 2008-12 | FP7 Program, HEALTH-F2-2007-202167, European Union. 497 580 €. |
| 2010-12 | Ministry of Science and Innovation, Cajal Blue Brain, Spain. 100 000 €. |
| 2011-13 | Ministry of Science and Innovation, BFU2010-15832, Spain. 318 000 €. |
| 2011-15 | Ministry of Science and Innovation, CDS2010-00045, Spain. 400 000 €. |
| 2014-17 | Human Frontier Science Program Organization. RGP0036/2014. 337 500$. |
| 2016-20 | NIH-NINDS, R01NS097312. USA. Annual direct costs: 305 990$. |
| 2018-23 | NIH-NINDS, R01NS108686. USA. Annual direct costs: 362 655$. |
| 2018-23 | NIH-NINDS, R01NS107387. USA. Annual direct costs: 218 750$. |
| 2019-24 | NIH-NIDA, R01DA048822. USA. Annual direct costs: 250 000$. |
| 2020-25 | NIH-NIMH, R01MH119355. USA. Annual direct costs: 250 000$. |

## *PUBLICATIONS*

111 publications cited 22329 times (average citations per paper: 201). 47 publications have more than 100 citations (marked in blue), and 25 of them are original papers. *H*-index= 59.

### *10 Selected Publications*


1. Lines J, Martin ED, Kofuji P, Aguilar J, Araque A (2020) Astrocytes modulate sensory-evoked neuronal network activity. **Nature Communications** 11:3689.
2. Cavaccini A, Durkee CD, Kofuji P, Tonini R, Araque A (2020) Astrocyte signaling gates long-term depression at corticostriatal synapses of the direct pathway. **Journal of Neuroscience** 40:5757-5768.
3. Corkrum M, Covelo A, Lines J, Bellocchio L, Pisansky M, Loke K, Quintana R, Rothwell PE, Lujan R, Marsicano G, Martin ED, Thomas MJ, Kofuji P, Araque A (2020) Dopamine-evoked synaptic regulation in the nucleus accumbens requires astrocyte activity. **Neuron** 105:1036-1047.
4. Covelo A, Araque A (2018) Neuronal activity determines distinct gliotransmitter release from a single astrocyte. **eLife** 7:e32237 DOI: 10.7554/eLife.32237.
5. Martin-Fernandez M, Jamison S, Robin LM, Zhao Z, Martin ED, Aguilar J, Benneyworth MA, Marsicano G, Araque A (2017) Synapse-specific astrocyte gating of amygdala-related behavior. **Nature Neuroscience** 20:1540-1548.
6. Martin R, Bajo-Grañeras R, Moratalla R, Perea G, Araque A (2015) Circuit-specific signaling in astrocyte-neuron networks in basal ganglia pathways. **Science** 349:730-734.
7. Navarrete M, Araque A (2010) Endocannabinoids potentiate synaptic transmission through stimulation of astrocytes. **Neuron** 68: 113-126.
8. Navarrete M, Araque A (2008) Endocannabinoids mediate neuron-astrocyte communication. **Neuron** 57: 883-893.
9. Perea G, Araque A (2007) Astrocytes potentiate transmitter release at single hippocampal synapses. **Science** 317: 1083-1086.
10. Perea G, Navarrete M, Araque A (2009) Tripartite synapses: astrocytes process and

control synaptic information. **Trends in Neurosciences** 32: 421-431.

***Complete List of Publications***

1. Lines J, Baraibar AM, Nanclares C, Martin E, Aguilar JLR, Kofuji P, Navarrete M, Araque A (2023) A spatial threshold for astrocyte calcium surge. **eLife** (in press) bioRxiv. 2023 Jul 19:2023.07.18.549563. doi: 10.1101/2023.07.18.549563.
2. Nanclares C, Noriega-Prieto JA, Labrada-Moncada FE, Cvetanovic M, Araque A, Kofuji P (2023) Altered calcium signaling in Bergmann glia contributes to spinocerebellar ataxia type-1 in a mouse model of SCA1. **Neurobiology of Disease** 187:106318. doi: 10.1016/j.nbd.2023.106318.
3. Lee YF, Russ AN, Zhao Q, Perle SJ, Maci M, Miller MR, Hou SS, Algamal M, Zhao Z, Li H, Gelwan N, Liu Z, Gomperts SN, Araque A, Galea E, Bacskai BJ, Kastanenka KV (2023) Optogenetic targeting of astrocytes restores slow brain rhythm function and slows Alzheimer's disease pathology. **Scientific Reports** 13:13075. doi: 10.1038/s41598-023-40402-3.
4. Nanclares C, Poynter J, Martell-Martinez HA, Vermilyea S, Araque A, Kofuji P, Lee MK, Covelo A (2023) Dysregulation of astrocytic $Ca^{2+}$ signaling and gliotransmitter release in mouse models of α-synucleinopathies. **Acta Neuropathologica** 145(5):597-610. doi: 10.1007/s00401-023-02547-3.
5. Miguel-Quesada C, Zaforas M, Herrera-Pérez S, Lines J, Fernández-López E, Alonso-Calviño E, Ardaya M, Soria FN, Araque A, Aguilar J, Rosa JM (2023) Astrocytes adjust the dynamic range of cortical network activity to control modality-specific sensory information processing. **Cell Reports** 42:112950.
6. Goenaga J, Araque A, Kofuji P, Herrera Moro Chao D (2023) Calcium signaling in astrocytes and gliotransmitter release. **Frontiers Synaptic Neuroscience** 15:1138577.
7. Marsicano G, Araque A (2023) Of glue and pot: Endocannabinoid signaling in glial cells. **Glia** 71:3-4.
8. Baraibar AM, Belisle L, Marsicano G, Matute C, Mato S, Araque A, Kofuji P (2023) Spatial organization of neuron-astrocyte interactions in the somatosensory cortex **Cerebral Cortex** 33:4498-4511. doi: 10.1093/cercor/bhac357
9. Liu D, Nanclares C, Simbriger K, Fang K, Lorsung E, Le N, Amorim IS, Chalkiadaki K, Pathak SS, Li J, Gewirtz JC, Jin VX, Kofuji P, Araque A, Orr HT, Gkogkas CG, Cao R (2023) Autistic-like behavior and cerebellar dysfunction in Bmal1 mutant mice ameliorated by mTORC1 inhibition. **Molecular Psychiatry** 28:3727-3738.
10. Noriega-Prieto JA, Kofuji P, Araque A (2023) Endocannabinoid signaling in synaptic function. **Glia** 71:36-43.
11. Brown JL, Hart DW, Boyle GE, Brown TG, LaCroix M, Baraibar AM, Pelzel R, Kim M, Sherman MA, Boes S, Sung M, Cole T, Lee MK, Araque A, Lesné SE (2022) SNCA genetic lowering reveals differential cognitive function of alpha-synuclein dependent on sex. **Acta Neuropathologica Communications** 10:180. doi: 10.1186/s40478-022-01480-y.
12. Lines J, Baraibar AM, Fang C, Martin ED, Aguilar J, Lee MK, Araque A, Kofuji P (2022) Astrocyte-neuronal network interplay is disrupted in Alzheimer's disease mice. **Glia** 70:368-378.
13. Yu D, Zarate N, White A, Coates D, Tsai W, Nanclares C, Cuccu F, Yue JS, Brown TG, Mansky RH, Jiang K, Kim H, Nichols-Meade T, Larson SN, Gundry K, Zhang Y, Tomas-Zapico C, Lucas JJ, Benneyworth M, Öz G, Cvetanovic M, Araque A, Gomez-Pastor R (2022) CK2 alpha prime and alpha-synuclein pathogenic functional interaction mediates synaptic dysregulation in huntington's disease. **Acta**

**Neuropathologica Communications** 10:83.
14. Oliveira JF, Araque A (2022) Astrocyte regulation of neural circuit activity and network states. **Glia** 70:1455-1466.
15. Nanclares C, Baraibar AM, Araque A, Kofuji P (2021) Dysregulation of Astrocyte-Neuronal Communication in Alzheimer's Disease. **International Journal of Molecular Sciences**. 22:7887.
16. Durkee C, Kofuji P, Navarrete M, A Araque (2021) Astrocyte and neuron cooperation in long-term depression. **Trends in Neurosciences** 44:837-848.
17. Corkrum M, Araque A (2021) Astrocyte-neuron signaling in the mesolimbic dopamine system: the hidden stars of dopamine signaling. **Neuropsychopharmacology** 46:1864-1872.
18. Kofuji P, Araque A (2021) Astrocytes control the critical period of circuit wiring. **Science** 373: 29-30.
19. Noriega-Prieto JA, Maglio LE, Zegarra-Valdivia JA, Pignatelli J, Fernandez AM, Martinez-Rachadell L, Fernandes J, Núñez Á, Araque A, Torres-Alemán I, Fernández de Sevilla D (2021) Astrocytic IGF-IRs Induce Adenosine-Mediated Inhibitory Downregulation and Improve Sensory Discrimination. **Journal of Neuroscience** 41:4768-4781.
20. Noriega-Prieto JA, Araque A (2021) Sensing and Regulating Synaptic Activity by Astrocytes at Tripartite Synapse. **Neurochemical Research** 46:2580-2585.
21. Fernández de Sevilla D, Nuñez A, Araque A, Buño W (2021) Metabotropic Regulation of Synaptic Plasticity. **Neuroscience** 456: 1-3.
22. Escartin C,…Araque A…,Verkhratsky A (2021) Reactive astrocyte nomenclature, definitions, and future directions. **Nature Neuroscience** 24:312-325.
23. Kofuji P, Araque A (2021) Astrocytes and behavior. **Annual Review of Neuroscience** 44:49-67.
24. Kofuji P, Araque A (2021) G-Protein-Coupled Receptors in Astrocyte-Neuron Communication. **Neuroscience** 456:71-84.
25. Lines J, Martin ED, Kofuji P, Aguilar J, Araque A (2020) Astrocytes modulate sensory-evoked neuronal network activity. **Nature Communications** 11:3689.
26. Cavaccini A, Durkee CD, Kofuji P, Tonini R, Araque A (2020) Astrocyte signaling gates long-term depression at corticostriatal synapses of the direct pathway. **Journal of Neuroscience** 40:5757-5768.
27. Corkrum M, Covelo A, Lines J, Bellocchio L, Pisansky M, Loke K, Quintana R, Rothwell PE, Lujan R, Marsicano G, Martin ED, Thomas MJ, Kofuji P, Araque A (2020) Dopamine-evoked synaptic regulation in the nucleus accumbens requires astrocyte activity. **Neuron** 105:1036-1047.
28. Fullana MN, Covelo A, Bortolozzi A, Araque A, Artigas F (2019) In vivo knockdown of astroglial glutamate transporters GLT-1 and GLAST increases excitatory neurotransmission in mouse infralimbic cortex: Relevance for depressive-like phenotypes. **European Neuropsychopharmacology** 29:1288-1294.
29. Kofuji P and Araque A (2019) Swelling gliotransmission by Swell1 channels. **Neuron** 102: 711-713.
30. Liu J, McDaid L, Araque A, Wade J, Harkin J, Karim S, Henshall DC, Connolly NMC, Johnson AP, Tyrrell AM, Timmis J, Millard AG, Hilder J, Halliday DM (2019) GABA Regulation of Burst Firing in Hippocampal Astrocyte Neural Circuit: A Biophysical Model. **Frontiers in Cellular Neuroscience** 13:335.
31. Corkrum M, Rothwell PE, Thomas MJ, Kofuji P, Araque A (2019) Opioid-mediated astrocyte-neuron signaling in the nucleus accumbens. **Cells** 8: E586.

32. Singh B, Covelo A, Martell-Martínez H, Nanclares C, Sherman MA, Okematti E, Meints J, Teravskis PJ, Gallardo C, Savonenko AV, Benneyworth MA, Lesné SE, Liao D, Araque A, Lee MK (2019) Tau is required for progressive synaptic and memory deficits in a transgenic mouse model of α-synucleinopathy. **Acta Neuropathologica** 138:551-574.
33. Durkee CA, Covelo A, Lines J, Kofuji P, Aguilar J, Araque A (2019) Gi/o protein-coupled receptors inhibit neurons but activate astrocytes and stimulate gliotransmission. **Glia** 67:1076-1093.
34. García-Cáceres C, Balland E, Prevot V, Luquet S, Woods SC, Koch M, Horvath TL, Yi CX, Chowen JA, Verkhratsky A, Araque A, Bechmann I, Tschöp MH (2019) Role of astrocytes, microglia, and tanycytes in brain control of systemic metabolism. **Nature Neuroscience** 22:7-14.
35. Durkee CA, Araque A (2018) Diversity and Specificity of Astrocyte-neuron Communication. **Neuroscience** 396: 73-78.
36. Covelo A, Araque A (2018) Stimulating Astrocytes to Remember. **Cell** 174: 12-13.
37. Teravskis PJ, Covelo A, Miller EC, Singh B, Martell-Martínez HA, Benneyworth MA, Gallardo C, Oxnard BR, Araque A, Lee MK, Liao D (2018) A53T Mutant Alpha-Synuclein Induces Tau-Dependent Postsynaptic Impairment Independently of Neurodegenerative Changes. **Journal of Neuroscience** 38: 9754-9767.
38. Covelo A, Araque A (2018) Neuronal activity determines distinct gliotransmitter release from a single astrocyte. **eLife** 7:e32237 DOI: 10.7554/eLife.32237.
39. Robin LM, Oliveira da Cruz JF, Langlais VC, Martin-Fernandez M, Metna-Laurent M, Busquets-Garcia A, Bellocchio L, Soria-Gomez E, Papouin T, Varilh M, Sherwood MW, Belluomo I, Balcells G, Matias I, Bosier B, Drago F, Van Eeckhaut A, Smolders I, Georges F, Araque A, Panatier A, Oliet SHR, and Marsicano G (2018) Astroglial CB1 receptors determine synaptic D-serine availability to enable recognition memory. **Neuron** 98:935-944.
40. Martin-Fernandez M, Jamison S, Robin LM, Zhao Z, Martin ED, Aguilar J, Benneyworth MA, Marsicano G, Araque A (2017) Synapse-specific astrocyte gating of amygdala-related behavior. **Nature Neuroscience** 20:1540-1548.
41. Lines J, Covelo A, Gómez R, Liu L, Araque A (2017) Synapse-Specific Regulation Revealed at Single Synapses Is Concealed When Recording Multiple Synapses. **Frontiers in Cellular Neuroscience** 11:367.
42. Araque A, Castillo PE, Manzoni OJ, Tonini R (2017) Synaptic functions of endocannabinoid signaling in health and disease. **Neuropharmacology**124:13-24.
43. Fernandez AM, Hernandez-Garzón E, Perez-Domper P, Perez-Alvarez A, Mederos S, Matsui T, Santi A, Trueba-Saiz A, García-Guerra L, Pose-Utrilla J, Fielitz J, Olson EN, Fernandez de la Rosa R, Garcia Garcia L, Pozo MA, Iglesias T, Araque A, Soya H, Perea G, Martin ED, Torres Aleman I (2017) Insulin regulates astrocytic glucose handling through cooperation with IGF-I. **Diabetes** 66:64-74.
44. Gómez-Gonzalo M, Martin-Fernandez M, Martínez-Murillo R, Mederos S, Hernández-Vivanco A, Jamison S, Fernandez AP, Serrano J, Calero P, Futch HS, Corpas R, Sanfeliu C, Perea G, Araque A (2017) Neuron-astrocyte signaling is preserved in the ageing brain. **Glia** 65:569-580.
45. Perea G, Gómez R, Mederos S, Covelo A, Ballesteros J, Schlosser L, Hernández-Vivanco A, Martín-Fernández M, Quintana R, Rayan A, Díez A, Fuenzalida M, Agarwal A, Bergles D, Bettler B, Manahan-Vaughan D, Martin ED, Kirchhoff F, Araque A (2016) Activity-dependent switch of GABAergic inhibition into glutamatergic excitation in astrocyte-neuron networks. **eLife** pii: e20362.

46. Hernandez-Garzón E, Fernandez AM, Perez-Alvarez A, Genis L, Bascuñana P, Fernandez de la Rosa R, Delgado M, Angel Pozo M, Moreno E, McCormick PJ, Santi A, Trueba-Saiz A, Garcia-Caceres C, Tschöp MH, Araque A, Martin ED, Torres Aleman I (2016) The insulin-like growth factor I receptor regulates glucose transport by astrocytes. **Glia** 64:1964-1971.
47. Martin R, Bajo-Grañeras R, Moratalla R, Perea G, Araque A (2015) Circuit-specific signaling in astrocyte-neuron networks in basal ganglia pathways. **Science** 349:730-734.
48. Covelo A, Araque A (2016) Lateral regulation of synaptic transmission by astrocytes. **Neuroscience** 323:62-66.
49. Oliveira JF, Sardinha VM, Guerra-Gomes S, Araque A, Sousa N (2015) Do stars govern our actions? Astrocyte involvement in rodent behavior. **Trends in Neurosciences** 38:535-549.
50. Gómez-Gonzalo M, Navarrete M, Perea G, Covelo A, Martín-Fernández M, Shigemoto R, Luján R, Araque A (2015) Endocannabinoids induce lateral long-term potentiation of transmitter release by stimulation of gliotransmission. **Cerebral Cortex** 25:3699-3712.
51. Perea G, Sur M, Araque A (2014) Neuron-glia networks: integral gear of brain function. **Frontiers in Cellular Neuroscience** 8:378.
52. Perez-Alvarez A, Navarrete M, Covelo A, Martin ED, Araque A (2014) Structural and functional plasticity of astrocyte processes and dendritic spine interactions. **Journal of Neuroscience** 34:12738-12744.
53. Jego P, Pacheco-Torres J, Araque A, Canals S (2014) Functional MRI in mice lacking IP3-dependent calcium signaling in astrocytes. **Journal of Cerebral Blood Flow & Metabolism** 34:1599-1603.
54. Navarrete M, Díez A, Araque A (2014) Astrocytes in endocannabinoid signaling. **Philosophical Transactions of the Royal Society B** 369: 20130599.
55. Navarrete M, Araque A (2014) The Cajal School and the physiological role of astrocytes: a way of thinking. **Frontiers in Neuroanatomy** 8:33.
56. Araque A, Camignoto G, Haydon PG, Oliet SH, Robitaille R, Volterra A (2014) Gliotransmitters travel in time and space. **Neuron** 81:728-739.
57. Fields RD, Araque A, Johansen-Berg H, Lim SS, Lynch G, Nave KA, Nedergaard M, Perez R, Sejnowski T, Wake H (2013) Glial Biology in Learning and Cognition. **Neuroscientist** 20:426-431.
58. Pérez-Alvarez A, Araque A, Martin ED (2013) Confocal microscopy for astrocyte in vivo imaging: Recycle and reuse in microscopy. **Frontiers in Cellular Neuroscience** 7:51.
59. Pérez-Alvarez A, Araque A (2013) Astrocyte-Neuron Interaction at Tripartite Synapses. **Current Drug Targets** 14:1220-1224.
60. Navarrete M, Perea G, Maglio L, Pastor J, de Sola RG, Araque A (2013) Astrocyte calcium signal and gliotransmission in human brain tissue. **Cerebral Cortex** 23: 1240-1246.
61. Navarrete M, Perea G, Fernandez de Sevilla D, Gómez-Gonzalo M, Núñez A, Martin ED, Araque A (2012) Astrocytes mediate in vivo cholinergic-induced synaptic plasticity. **Plos Biology** 10: e1001259.
62. Zorec R, Araque A, Carmignoto G, Haydon PG, Verkhratsky A, Parpura V (2012) Astroglial excitability and gliotransmission: An appraisal of $Ca^{2+}$ as a signaling route. **ASN Neuro** 4: e00080.
63. Araque A, Navarrete M (2011) Electrically driven insulation in the central nervous

system. **Science** 333: 1587-1588.
64. Navarrete M, Araque A (2011) Basal synaptic transmission: astrocytes rule! **Cell** 146: 675-677.
65. Porto-Pazos AB, Veiguela N, Mesejo P, Navarrete M, Alvarellos A, Ibáñez O, Pazos A, Araque A (2011) Artificial astrocytes improve neural network performance. **PLoS One** 6: e19109.
66. Navarrete M, Araque A (2010) Endocannabinoids potentiate synaptic transmission through stimulation of astrocytes. **Neuron** 68: 113-126.
67. Perea G, Araque A (2010) Glia modulates synaptic transmission. **Brain Research Reviews** 63: 93-102.
68. Araque A, Navarrete M (2010) Glial cells in neuronal network function. **Philosophical Transactions of the Royal Society B** 365: 2375-2381.
69. Perea G, Navarrete M, Araque A (2009) Tripartite synapses: astrocytes process and control synaptic information. **Trends in Neurosciences** 32: 421-431.
70. Navarrete M, Araque A (2008) Endocannabinoids mediate neuron-astrocyte communication. **Neuron** 57: 883-893.
71. Araque A (2008) Astrocytes process synaptic information. **Neuron Glia Biology** 4:3-10.
72. Cebolla B, Fernández-Pérez A, Perea G, Araque A, Vallejo M (2008) DREAM mediates cAMP-dependent, $Ca^{2+}$-induced stimulation of GFAP gene expression and regulates cortical astrogliogenesis. **Journal of Neuroscience** 28: 6703-6713.
73. Perea G, Araque A (2007) Astrocytes potentiate transmitter release at single hippocampal synapses. **Science** 317: 1083-1086.
74. Martin ED, Fernández M, Perea G, Pascual O, Haydon PG, Araque A, Ceña V (2007) Adenosine released by astrocytes contributes to hypoxia-induced modulation of synaptic transmission. **Glia** 55: 36-45.
75. Porto A, Araque A, Rabuñal J, Dorado J, Pazos A (2007) A new hybrid evolutionary mechanism based on unsupervised learning for Connectionist Systems. **Neurocomputing** 70: 2799-2808.
76. Araque A (2006) Astrocyte-neuron signaling in the brain: implications for disease. **Current Opinion in Investigational Drugs** 7: 619-624.
77. Perea G, Araque A (2006) Synaptic information processing by astrocytes. **Journal of Physiology (Paris)** 99: 92-97.
78. Perea G, Araque A (2005) Glial calcium signalling and neuron-glia comunication. **Cell Calcium** 38: 375-382.
79. Perea G, Araque A (2005) Properties of synaptically evoked astrocyte $Ca^{2+}$ signal reveal synaptic information processing by astrocytes. **Journal of Neuroscience** 25: 2192–2203.
80. Perea G, Araque A (2005) Synaptic regulation of the astrocyte calcium signal. **Journal of Neural Transmission** 112: 127-135.
81. Araque A, Perea G (2004) Glial modulation of synaptic transmission in culture. **Glia** 47: 241–248.
82. Carrer HF, Araque A, Buño W (2003) Estradiol regulates the slow $Ca^{2+}$ -activated $K^{+}$ current in hippocampal pyramidal neurons. **Journal of Neuroscience** 23: 6338-6344.
83. Perea G, Araque A (2002) Communication between astrocytes and neurons: a complex language. **Journal of Physiology (Paris)** 96: 199-207.
84. Araque A, Martin ED, Perea G, Arellano JI, Buño W (2002) Synaptically released acetylcholine evokes $Ca^{2+}$ elevations in astrocytes in hippocampal slices. **Journal of Neuroscience** 22: 2443-2450.

85. Martin ED, Araque A, Buño W (2001) Synaptic regulation of the slow $Ca^{2+}$-activated $K^+$ current in hippocampal CA1 pyramidal neurons: Implication in epileptogenesis. **Journal of Neurophysiology** 86: 2878-2886.
86. Araque A, Carmignoto G, Haydon PG (2001) Dynamic signaling between astrocytes and neurons. **Annual Review of Physiology** 63: 795-813.
87. Araque A, Nianzhen L, Doyle RT, Haydon PG (2000) SNARE protein-dependent glutamate release from astrocytes. **Journal of Neuroscience** 20: 666-673.
88. Araque A, Parpura V, Sanzgiri RP, Haydon PG (1999) Tripartite synapses: Glia, the unacknowledged partner. **Trends in Neurosciences** 22: 208-215.
89. Araque A, Sanzgiri RP, Parpura V, Haydon PG (1999) Astrocyte-induced modulation of synaptic transmission. **Canadian Journal of Physiology and Pharmacology** 77:699-706.
90. Sanzgiri RP, Araque A, Haydon PG (1999) Prostaglandin $E_2$ stimulates glutamate receptor-dependent astrocyte neuromodulation in cultured hippocampal cells. **Journal of Neurobiology** 41:221-229.
91. Araque A, Buño W (1999) Fast BK-type channel mediates the $Ca^{2+}$-activated $K^+$ current in crayfish muscle. **Journal of Neurophysiology** 82: 1655-1661.
92. Araque A, Sanzgiri RP, Parpura V, Haydon PG (1998) Calcium elevation in astrocytes causes an NMDA receptor-dependent increase in the frequency of miniature synaptic currents in cultured hippocampal neurons. **Journal of Neuroscience** 18: 6822-6829.
93. Araque A, Parpura V, Sanzgiri RP, Haydon PG (1998) Glutamate-dependent astrocyte modulation of synaptic transmission between cultured hippocampal neurons. **European Journal of Neuroscience** 10: 2129-2142.
94. Araque A, Marchand A, Buño W (1998) Voltage-gated and $Ca^{2+}$-activated conductances mediating and controlling graded electrical activity in crayfish muscle. **Journal of Neurophysiology** 79: 2338-2344.
95. Castellote JM, Araque A, Buño W (1997) GABA-induced long-term modulation of L-type $Ca^{2+}$ conductance in crustacean muscle fibers. **Pflügers Archiv** 434: 272-279.
96. Araque A, Urbano FJ, Cerveñansky C, Gandía L, Buño W (1995) Selective block of $Ca^{2+}$-dependent $K^+$ current in crayfish neuromuscular system and chromaffin cells by sea anemone *Bunodosoma cangicum* venom. **Journal of Neuroscience Research** 42:539-546.
97. Araque A, Buño W (1995) Fast, persistent, $Ca^{2+}$-dependent $K^+$ current controls graded electrical activity in crayfish muscle. **Pflügers Archiv** 430: 541-551.
98. Araque A, Cattaert D, Buño W (1995) $Cd^{2+}$-blockade of the hyperpolarization-activated current $I_{AB}$ in crayfish muscle. **Journal of General Physiology** 105: 725-744.
99. Cattaert D, Araque A, Buño W, Clarac F (1994) Nicotinic and muscarinic activation of motoneurons in the crayfish locomotor network. **Journal of Neurophysiology** 72: 1622-1633.
100. Barrio LC, Araque A, Buño W (1994) Participation of voltage-gated conductances on the response succeeding inhibitory synaptic potentials in the crayfish slowly adapting stretch receptor neuron. **Journal of Neurophysiology** 72: 1140-1151.
101. Araque A, Clarac F, Buño W (1994) P-type $Ca^{2+}$ channels mediate excitatory and inhibitory synaptic transmitter release in crayfish muscle. **Proceedings of the National Academy of Sciences USA** 91: 4224-4228.
102. Cattaert D, Araque A, Buño W, Clarac F (1994) Motor neurones of the crayfish walking systems possess $TEA^+$-revealed regenerative electrical properties. **Journal of Experimental Biology** 188: 339-345.
103. Araque A, Buño W (1994) Novel hyperpolarization-activated $K^+$ current mediates

anomalous rectification in crayfish muscle. **Journal of Neuroscience** 14: 399-408.

104. Araque A, Ferreira W, Lucas S, Buño W (1992) Glutamatergic postsynaptic block by *Pamphobeteus* spider venoms in crayfish. **Brain research** 571: 109-114.
105. Araque A, Buño W (1991) Novel inward rectifier blocked by $Cd^{2+}$ in crayfish muscle. **Brain research** 563: 321-324.
106. Barrio LC, Araque A, Abraira V, Buño W (1991) Intracellular analysis of excitatory inhibitory synaptic interactions in crayfish stretch receptors. **Journal of Neurophysiology** 66: 894-904.

## *BOOKS*

1. Swanson LW, Newman E, **Araque A,** Dubinsky JM**.** The Beautiful Brain: The Drawings of Santiago Ramon y Cajal. 2017. Abrams.

## *BOOK CHAPTERS*

1. Deitmer JW, Araque A (2009) Astrocyte $Ca^{2+}$ signalling. In: Encyclopedia of Neuroscience. Ed: Squire L. Elsevier. pp 565-572.
2. Perea G, Araque A (2009) Synaptic information processing by astrocytes. In: Astrocytes in (Patho)Physiology of the Nervous System. Eds: Parpura V, Haydon PG. Springer. Pp 287-300.
3. Martin ED, Araque A (2005) Astrocytes and the biological neural networks. In: Artificial Neural Networks in Real-Life Applications. Eds: Rabuñal JR, Dorado J. Idea Group Publishing. pp: 22-45.
4. Haydon PG, Araque A (2002) Astrocytes as modulators of synaptic transmission. In: Tripartite Synapses: Synaptic transmission with glia. Eds: Volterra A, Magistretti P, Haydon PG. Oxford University Press. pp: 185-198.

## *OTHER PUBLICATIONS*

1. Araque A, Navarrete M (2013) El ayer y hoy de los astrocitos. Mente y Cerebro 60: 86-91.
2. Perea G, Araque A (2007) Sinapsis Tripartita. Mente y Cerebro 27: 50-55.
3. Perea G, Araque A (2003) Nuevas vías de información en el sistema nervioso: comunicación entre astrocitos y neuronas. Revista de Neurología 36: 137-144.

## *SCIENTIFIC MANAGMENT ACTIVITIES*

**Coordinator.** Biomedicine area, Spanish National Agency of Evaluation and Prospective (ANEP) (2009-11).

**Associate Coordinator.** Physiology and Pharmacology area, ANEP (2005-2008).

**Section Committee Member.** Academia Europaea. Physiology and Neuroscience (2015-2022).

**Editorial Board Member:** European Journal of Neuroscience (2008-2010), eNeuro (2014-2020), Glia, Cell Calcium, Neuroscience (Section Editor; 2016 - present).

**Reviewer ad hoc for Journals**: Science, Nature, Cell, Nature Reviews Neuroscience, Neuron, Nature Neuroscience, PloS Biology, Trends in Neurosciences, Nature Protocols, Journal of Neuroscience, Brain, Molecular Psychiatry, Developmental Cell, Aging Cell, Journal of Physiology, Glia, Journal of Neurophysiology, European

Journal of Neuroscience, PloS One, Cerebral Cortex, Neuroscience, Neuropsychopharmacology, ASN Neuro, Biochimica et Biophysica Acta, FEBS Letters, Journal of Neurochemistry, Neuroscience Letters, Hippocampus, Synapse, Philosophical Transactions of the Royal Society, Current Drug Abuse Reviews, Frontiers Computational Neuroscience, Journal of Neurological Sciences, Future Lipidology, Brain Research, Experimental Brain Research, Developmental Brain Research, Cell Physiology Biochemistry, Journal Biological Physics, Journal Neuroscience Methods.

**Reviewer ad hoc of research grants** for: ANEP, Spain. The Welcome Trust, UK. National Institutes of Health (NIH), USA. National Science Foundation (NSF), USA. FONDECYT, Chile. FRC, France. DICyT, Uruguay. Israel Science Foundation, Israel. FRM, France. ANR, France. MRC, UK. Swiss National Science Foundation, Switzerland. LABEX, France. ELS Center for Brain Sciences, Israel. FWO Flanders, Belgium. MSI, Chile. Neurological Foundation, New Zealand.

**Member of Scientific Societies**: Spanish Society for Neuroscience, FENS, Spanish Society for Physiological Sciences, Academia Europaea, Society for Neuroscience (USA).

**Member of Program, Steering and Organizing Committees:**

XXXIV Spanish Society for Physiological Sciences 2007.
XIV Spanish Society for Neuroscience meeting 2011.
8th FENS Forum 2012.
11th EuroGlia Meeting 2013.
12th EuroGlia Meeting 2015.

**Symposia Organizer:**

FENS Forum. Lisbon, Portugal, 2004.
Spanish Society for Neuroscience meeting. Malaga, Spain, 2005.
FENS Forum. Geneva, Switzerland, 2008.
EuroGlia Meeting, Paris, France, 2009.
FENS Forum. Milan, Italy, 2014.
EuroGlia Meeting, Edinburgh, United Kingdom, 2017.
Satellite Meeting, Euroglia Meeting, Braga/Porto, Portugal, 2019.
International Society for Neurochemistry meeting, Montreal, Canada, 2019.
EuroGlia Meeting, Marseille, France, 2021.

**Co-curator** of the exhibition THE BEAUTIFUL BRAIN: DRAWINGS OF SANTIAGO RAMÓN Y CAJAL. Itinerary exhibition of 80 original drawings of Cajal displayed at Weisman Art Museum, University of Minnesota, Minneapolis, USA (January 28 – May 21, 2017), Morris and Helen Belkin Art Gallery, University of British Columbia, Vancouver, British Columbia, Canada (September 5 – December 3, 2017), Grey Art Gallery, New York University, New York City, New York, USA (January 9 – March 31, 2018), MIT Museum, Massachusetts Institute of Technology, Cambridge, Massachusetts, USA (May 2, 2018 – January 1, 2019), Ackland Art Museum, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA (January 27 – April 7, 2019).

## *INVITED TALKS*

1. Department of Physiology, University of Uruguay, URUGUAY. November 1994.
2. IIB Clemente Estable, Montevideo, URUGUAY. November 1994.
3. Dept. of Zoology and Genetics. Iowa State University, Iowa, USA. November 1996.
4. Instituto Cajal, CSIC, Madrid, SPAIN. July 1997.
5. Research Department, Hospital Ramón y Cajal, Madrid, SPAIN. June 1999.
6. School of Medicine, Universidad Complutense de Madrid, SPAIN. March 2001.
7. School of Medicine, Universidad Autónoma de Madrid, SPAIN. March 2001.
8. School of Biology. University of Barcelona, SPAIN. May 2001.
9. College de France. Paris. FRANCE. October 2001.
10. Instituto Neurociencias-Univ. M. Hernández. Alicante, SPAIN. February 2002.
11. Research Department, Hospital Ramón y Cajal, Madrid, SPAIN. May 2002.
12. Universidad de Valparaíso. Valparaíso, CHILE. October 2002.
13. Universidad Católica de Chile. Santiago de Chile, CHILE. October 2002.
14. CRIB, Universidad de Castilla La Mancha. Albacete, SPAIN. October 2003.
15. Ramón Areces Foundation. Madrid, SPAIN. December 2003.
16. Institut Alfred Fessard, CNRS. Gif-sur-Yvette, Paris, FRANCE, December 2004.
17. Dutch Society for Neuroscience, NETHERLAND. June 2005.
18. University of Kaiserslautern. Kaiserslautern, GERMANY. September 2005.
19. Instituto Neurociencias-Univ. M. Hernández. Alicante, SPAIN. November 2005.
20. Ramón Areces Fundation. Madrid, SPAIN. November 2005.
21. College Veterinaty Medicine. Iowa State University. Iowa, USA. November 2005.
22. Instituto Neurociencias-Universidad Autónoma Barcelona. SPAIN. June 2006.
23. CSIC. Madrid, SPAIN. November 2006.
24. Universidad del País Vasco. Bilbao, SPAIN. February 2007.
25. Gordon Research Conference. Ventura, California, USA. March 2007.
26. Instituto de Parasitología López Neyra, CSIC. Granada, SPAIN. April 2007.
27. French Society for Neuroscience. Montpellier, FRANCE. May 2007.
28. Universidad de A Coruña. La Coruña, SPAIN. October 2007.
29. MRC - University of Bristol. Bristol, UNITED KINGDOM, April 2008.
30. Red Olfativa Española. Asturias, SPAIN. May 2008.
31. University of Minnesota. Minneapolis, USA. September 2008.
32. Societat Catalana de Biologia. Barcelona, SPAIN. October 2008.
33. Albert Einstein College of Medicine. New York, USA. November 2008.
34. Universidad de Valladolid. Valladolid, SPAIN. December 2008.
35. Strasbourg, FRANCE, January 2009.
36. INCyL - Universidad de Salamanca. Salamanca, SPAIN. January 2009.
37. Université René Descartes. Paris, FRANCE. April 2009.
38. Universidad de Sevilla – IBIS. Sevilla, SPAIN. June 2009.
39. Universidad de Cádiz. Cádiz, SPAIN. June 2009.
40. Institut du Fer a Moulin, INSERM. Paris, FRANCE. September 2009.
41. Spanish Society for Neuroscience (SENC). Tarragona, SPAIN. September 2009.
42. CNR Meeting. Cavalese, ITALIA. January 2010.
43. Universidad Politécnica de Madrid. Madrid, SPAIN. February 2010.
44. Universidad Pablo de Olavide. Sevilla, SPAIN. February 2010.
45. Universidade A Coruña. A Coruña, SPAIN. March 2010.
46. University Amsterdam. Amsterdam, NETHERLANDS. October 2010.
47. Universidad del País Vasco. Bilbao, SPAIN. October 2010.

48. Instituto de Investigación Biomédica de Bellvitge. Barcelona, SPAIN. January 2011.
49. Instituto de Neurociencias de Alicante. Alicante, SPAIN. February 2011.
50. Universidade A Coruña. A Coruña, SPAIN. March 2011.
51. Ramón Areces Foundation. Madrid, SPAIN. March 2011.
52. Instituto de Ciências da Vida e da Saúde (ICVS). Braga, PORTUGAL. April 2011.
53. Centre for Applied Medical Research, CIMA. Pamplona, SPAIN. May 2011.
54. Gordon Research Conference. Les Diablerets, SWITZERLAND. May 2011.
55. Yale-CSIC Meeting. Madrid. September 2011.
56. International Meeting on mGluRs. Sicily, ITALY. October 2011.
57. ENP meeting. Paris, FRANCE. October 2011.
58. Neurosci Mental Health Res. Inst. Cardiff, UNITED KINGDOM. November 2011.
59. IDINE-Universidad de Castilla La Mancha. Albacete, SPAIN. November 2011.
60. Université de Lausanne. SWITZERLAND. November 2011.
61. Universidade de Lisboa. PORTUGAL. February 2012.
62. Universidade A Coruña. A Coruña, SPAIN. June 2012.
63. Ikerbasque Achucarro Center. Bilbao, SPAIN. October 2012.
64. NIH. Virginia, USA. February 2013.
65. University of Minnesota. Minneapolis, USA. February 2013.
66. Universidade A Coruña. A Coruña, SPAIN. June 2013.
67. Yale University. New Haven, USA. November 2013.
68. University Alabama at Birmingham. Birmingham, Alabama. USA. November 2013.
69. Blankenese Conferences. Hamburg-Blankenese, GERMANY. May 2014.
70. Dutch Endo-Neuro-Psycho Meeting. Lunteren, NETHERLANDS. May 2014.
71. International University Menendez Pelayo, Santander. SPAIN. July 2014.
72. University of Saarland, Homburg, GERMANY. October 2015.
73. Instituto de Neurociencias de Alicante. Alicante, SPAIN. December 2015.
74. University of Valparaiso. Valparaiso, CHILE. January 2016.
75. Austral University of Chile. Valdivia, CHILE. January 2016.
76. Tufts University. Boston, Massachusetts. USA. February 2016.
77. Université de Montreal. Montreal, CANADA. March 2016.
78. Instituto de Neurociencias de Alicante. Alicante, SPAIN. September 2016.
79. University of Sevilla. Sevilla, SPAIN. September 2016.
80. Instituto Cajal, Madrid, SPAIN. July 2017.
81. Instituto Hospital Mar de Investigaciones Médicas, Barcelona SPAIN. October 2017.
82. University of British Columbia, Vancouver, CANADA. September 2017.
83. Helmholtz Zentrum München, Institute for Diabetes and Obesity. Munich, GERMANY. October 2017.
84. NIDA-NIAAA mini-convention. Washington DC, USA. November 2017.
85. University of Saarland, Homburg, GERMANY. December 2017.
86. University of Texas at San Antonio. Texas, USA. February 2018.
87. Marquette University. Milwaukee, Wisconsin, USA. February 2018.
88. Bonn Center of Neurosciences. Bonn, GERMANY, March 2018.
89. Carleton College. Northfield, Minnesota, USA. April 2018.
90. Cinvestav, Ciudad de Mexico, MEXICO. October 2018.
91. Universidad Nacional Autonoma de Mexico, Querétaro, MEXICO. October 2018.
92. MIT, Cambridge, Massachusetts, USA. December 2018.
93. PNI Training Program, University of Minnesota. Minneapolis, USA. January 2019.
94. Johns Hopkins University. Baltimore, USA. November 2019.
95. Universidad Autónoma de Madrid. Madrid, SPAIN. November 2019.

96. Medical University of South Carolina. Charleston, USA. January 2020.
97. Instituto Medicina Molecular. University of Lisbon. PORTUGAL. June 2020.
98. University of Pittsburgh. Pittsburgh, USA. September 2020.
99. Universidad Nacional Autonoma de Mexico, Querétaro, MEXICO. November 2020.
100. Massachusetts General Hospital Harvard University, Boston, USA. January 2021.
101. King's College London, UNITED KINGDOM. April 2021.
102. University La Sapienza, Rome, ITALY. April 2022.
103. SENC Cajal Conference, Plenary Speaker, Costa Brava, SPAIN. May 2022.
104. Cajal International Neuroscience Center, Madrid, SPAIN. May 2022.
105. Universidad de la República, Montevideo, URUGUAY. June 2022.
106. Ikerbasque Achucarro Center, Bilbao, SPAIN. July 2022.
107. Mayo Clinic College of Medicine, Rochester, USA. August 2022.
108. Universidad Nacional Autonoma de Mexico, Mexico City, MEXICO. October 2022.
109. Istituto Italiano di Tecnología, Genova, ITALY. November 2022.
110. Fluorescence Neuro-Imaging and Photonics (FNIP). Webinar. December 2022.
111. Qingdao University, Qingdao, CHINA. December 2022.
112. Universidad de Lima, Lima, PERU. December 2022.
113. Vanderbilt University, Nashville, Tennessee, USA. January 2023.
114. Emory University Emory University Udall Center for Parkinson's Disease Research, Atlanta, Georgia, USA. April 2023.
115. Colegio Nacional de Mexico. Virtual outreach session. MEXICO. August 2023.

## *THESES SUPERVISION*

Ana Belén Porto. "Modelos Computacionales para optimizar el aprendizaje y el procesamiento de la información en sistemas adaptativos: Redes NeuroGliales Artificiales (RR. NG. AA.)". Codirector: Dr. Alejandro Pazos Sierra. Universidade da Coruña. July 9, 2004.

Gertrudis Perea. "Mecanismos y consecuencias fisiológicas de la señalización entre astrocitos y neuronas". Facultad de Medicina. Universidad Autónoma de Madrid. September 22, 2006. **Extraordinary Award** to the best PhD Thesis.

Marta Navarrete. "Mecanismos de señalización no-canónica entre neuronas y astrocitos". Facultad de Medicina. Universidad Autónoma de Madrid. May 22, 2009.

Ana Covelo. "Modulación sináptica a corto y largo plazo mediada por astrocitos en hipocampo". Universidad Autónoma de Madrid. September 29, 2015.

Adolfo Díez. "Propiedades de la modulación sináptica mediada por astrocitos en las columnas corticales de la corteza somatosensorial primaria. Universidad Autónoma de Madrid. May 20, 2016

Mario Martin-Fernández. "Regulación de la actividad neuronal mediada por astrocitos en la porción medial de la amígdala central". Universidad Autónoma de Madrid. May 14, 2018.

Caitlin Durkee. "G protein signaling in astrocytes regulates neuronal excitability and synaptic plasticity". Graduate Program in Neuroscience, University of Minnesota. March 27, 2019.

Michelle Corkrum. "Astrocyte-neuron signaling in the nucleus accumbens: implications for brain reward circuitry". Graduate Program in Neuroscience, University of

Minnesota. April 1, 2019.

Justin Lines. "Cortical astrocyte-neuron network interaction in health and disease". Graduate Program in Neuroscience, University of Minnesota. October 15, 2020.

Austin Ferro. "The Role of Microglia and Astrocyte in Spinocerebellar Ataxia Type 1". Graduate Program in Neuroscience, University of Minnesota. November 20, 2020.

Julianna Goenaga. Under progress. Graduate Program in Neuroscience, University of Minnesota. (Graduation expected in 2023).

## *TEACHING AT THE UNIVERSITY OF MINNESOTA*

Director and Professor. NSCI 1001 Fundamental Neuroscience. Spring 2014- present.

Professor. NSC 5461 Cellular and Molecular Neuroscience. Fall 2013- present.

## *TEACHING AND TRAINING* (Besides regular teaching duties at the Univ. Minnesota)

Assistant of Annual Postgraduate Course. School of Medicine, Universidad Autonoma de Madrid. 1988-1992.

Professor of Annual Postgraduate Course. School of Medicine, Universidad Autonoma de Madrid. 1994-1995.

Professor of Annual Postgraduate Course. Iowa State University. Iowa. USA. 1996-1997.

Invited Professor. V Latinoamerican School of Neuroscience. Montevideo, Uruguay. 2000.

Invited Professor. VI National School of Neurosciences. Universidad Internacional de Andalucía. La Rábida, Huelva. 2000.

Professor of Annual Postgraduate Course. School of Medicine, Universidad Autonoma de Madrid. 2001-2007.

Invited Professor. VII Latinoamerican School of Neuroscience. Montevideo, Uruguay. 2002.

Invited Professor. I Postgraduate Course. Universidad de Valparaíso, Chile. 2002.

Professor. Master on-line in Spain and Latinamerica. Universidad Pablo de Olavide and Centro de Estudios Avanzados para América Latina y el Caribe. 2005-2011.

Invited Professor. Course BIOS, Centro de Apoyo al Profesorado de Madrid. 2006 and 2008.

Director and Professor of Annual Postgraduate Course. School of Medicine, Universidad Autonoma de Madrid. 2008.

Invited Professor. X Curso Nacional de Neurociencias. Universidad Pablo de Olavide-Instituto Cajal (CSIC). Carmona, Sevilla. 2008.

Invited Professor. VI Atlantic Meeting in Neurosciences. National Course of Neurosciences. Universidad de A Coruña - Universidad Internacional Menéndez Pelayo. Coruña. 2009.

Invited Professor. Master in Neurosciences. INCyL and Universidad Salamanca. 2010.

Director and Professor. Master in Neuroscience. School of Medicine, Universidad Autonoma de Madrid. 2011.

Organizer. First International Astrocyte School. Bertinoro, Italy. 2011.

Organizer. 2nd International Astrocyte School. FENS/IBRO School. Bertinoro, Italy. 2012.

Organizer. 3rd International Astrocyte School. Bertinoro, Italy. 2013.

Professor. Cellular and Molecular Neuroscience Course. University of Minnesota. 2014.

Organizer. 4th International Astrocyte School. Bertinoro, Italy. 2014.

Invited Professor. XIII School of Pharmacology. International University Menendez Pelayo. Santander, Spain. 2014.

Organizer. 5th International Astrocyte School. Bertinoro, Italy. 2015.

Invited Professor. IBRO Kemali School. Pozzuoli, Italy. 2015.

Organizer. 6th International Astrocyte School. Bertinoro, Italy. 2016.

Invited Professor. FENS-ISN-IBRO school "Glial cells in health and disease". Bordeaux, France. November 2016

Organizer. 7th International Astrocyte School. Bertinoro, Italy. 2017.

Organizer. 8th International Astrocyte School. Bertinoro, Italy. 2018.

Organizer. 9th International Astrocyte School. Bertinoro, Italy. 2019.

Organizer. 10th International Astrocyte School. Bertinoro, Italy. 2020.

Organizer. 10th International Astrocyte School. Bertinoro, Italy. 2021.

Organizer. 11th International Astrocyte School. Bertinoro, Italy. 2022.

Organizer. 12th International Astrocyte School. Bertinoro, Italy. 2023.

Organizer. 13th International Astrocyte School. Bertinoro, Italy. 2024.