

Audrey Denizot

Research Experience

- 2023.02-now** Inria research scientist (CR), AIStroSight, Inria, Lyon, France
2021-2022 JSPS postdoctoral fellow, CNU, OIST, Japan. Advisor: Pr. E. De Schutter
2020-2021 Postdoctoral Scholar, CNU, OIST, Japan. Advisor: Pr. E. De Schutter
2016-2019 PhD, Beagle team, Inria, LIRIS, France. Advisors: Dr. H. Berry & Pr. H. Soula
Simulating calcium signaling in fine astrocytic processes.

Research internships in experimental & computational neuroscience

- 2016 Neurocentre Magendie, France. Advisor: Dr. A. Panatier
2015 Beagle team, Inria, France. Advisors: Dr. H. Berry & Pr. H. Soula
2013 University of Cambridge, England. Advisors: Dr. R. T. Káradóttir & Dr. H. Gautier
2012 Neuroscience research centre, Lyon, France. Advisors: Dr. E. Sotirakis & Pr. J. Honnorat

Education & Diplomas

- 2016-2019** PhD in computational neuroscience, LIRIS, INSA Lyon, France
2016 Master Biosciences (M.Sc. degree in Biology), ENS Lyon, France
2014-2015 Préparation à l'agrégation (biology & earth sciences teaching diploma), ENS Lyon, France
2012 License Biosciences (B.Sc. degree in Biology), ENS Lyon, France
2009-2011 Classe préparatoire scientifique, Lycée Carnot, Dijon, France

Awards & Grants

- 2021-2023** Grants-in-Aid for JSPS Research Fellow (JSPS International Research Fellow) grant
2021-2023 JSPS Postdoctoral Standard Long-term Postdoctoral grant
2021 Best Poster Award, 1st Virtual Conference of the European Society for Neurochemistry
2020 2020 Trainee Professional Development Award (TPDA), Society for Neuroscience
2019 Travel award for the annual CNS meeting 2019
2018 LIRIS International Mobility Grant
2016-2019 PhD funding by the French Ministry of Superior Education (CDSN)
2011-2016 State Agent-Student position for excellence at ENS Lyon ("Normalien" grade)

Publications

Code: *: equal contribution

Peer-Reviewed Journals

- A. Denizot, M. Arizono, U. V. Nägerl, H. Berry, & E. De Schutter. "Control of Ca²⁺ signals by astrocyte nanoscale morphology at tripartite synapses", *Glia*, Sep. 2022, vol. 70, p. 2378-2391.

- A. Covelo, A. Badoual, Reinforcing interdisciplinary collaborations to unravel the astrocyte “Calcium Code”, J. Mol. Neurosci., May 2022.
- **A. Denizot**, M. Arizono, U. V. Nägerl, H. Soula, and H. Berry, “Simulation of calcium signaling in fine astrocytic processes: Effect of spatial properties on spontaneous activity”, PLOS Computational Biology, vol. 15, p. e1006795, Aug. 2019.
- K. Ceyzériat, L. Ben Haim, **A. Denizot**, D. Pommier, M. Matos, O. Guillemaud, M.-A. Palomares, L. Abjean, F. Petit, P. Gipchtein, M.-C. Gaillard, M. Guillermier, S. Bernier, M. Gaudin, G. Aurégan, C. Joséphine, N. Déchamps, J. Veran, V. Langlais, K. Cambon, A. P. Bemelmans, J. Baijer, G. Bonvento, M. Dhenain, J.-F. Deleuze, S. H. R. Olié, E. Brouillet, P. Hantraye, M.-A. Carrillo-de Sauvage, R. Olaso, A. Panatier, and C. Escartin, “Modulation of astrocyte reactivity improves functional deficits in mouse models of Alzheimer’s disease”, Acta Neuropathologica Communications, vol. 6, p. 104, Oct. 2018.

Preprints

- **A. Denizot**, M. F. Veloz Castillo, P. Puchenvkov, C. Cali, E. De Schutter. “The endoplasmic reticulum in perisynaptic astrocytic processes: shape, distribution and effect on calcium activity”, bioRxiv, 2022, doi:10.1101/2022.02.28.482292.

Book chapters

- K. Lenk*, **A. Denizot***, B. Genocchi, I. Seppälä, M. Taheri, S. Nadkarni, “Computational models of astrocyte function at glutamatergic synapses”, in: “New Technologies for Glutamate Interactions: Neurons and Glia”, pp. 229–263, Springer US, 2024.
- **A. Denizot**, H. Berry, and S. Venugopal, “Computational Modeling of Intracellular Calcium Signals in Astrocytes”, in: Jaeger, D., Jung, R. (Eds.), Encyclopedia of Computational Neuroscience, 2020. Springer, New York, NY, pp. 1–12.

Peer-reviewed International Conference Proceedings

- **A. Denizot**, C. Cali, H. Berry, E. De Schutter. “Stochastic Spatially-Extended Simulations Predict the Effect of ER Distribution on Astrocytic Microdomain Ca²⁺ Activity”. Proceedings of the Eight Annual ACM International Conference on Nanoscale Computing and Communication (pp. 1-5), Sept. 2021.
- A. Badoual, M. Arizono, **A. Denizot**, M. Ducros, H. Berry, U. V. Nägerl, C. Kervrann. “Simulation of Astrocytic Calcium Dynamics in Lattice Light Sheet Microscopy Images”. IEEE 18th International Symposium on Biomedical Imaging (ISBI) (pp. 135-139). IEEE, April 2021

Presentations

Code: †: Poster, ¶: talk, ★: invited talk

- **A. Denizot**, P. Puchenvkov, E. De Schutter. “Linking astrocyte function to cell shape: insights from computational models”, French Glial Cell Club annual meeting, Sète, France, October 2024. †
- “Linking astrocyte nano-architecture and function: insights from computational tools”, “Linking brain structure & function at the nanoscale: an interdisciplinary workshop”, Lyon, France, September 2024. ¶
- “Linking astrocyte shape to function at the nanoscale: insights from computational approaches”, Astrocyte Cafe, online, May 2024. ¶
- “Towards elucidating astrocyte function in the brain: insights from stochastic spatially-extended models”, Groupe de Travail Maths-Bio, Lyon, France, May 2024. ★

- “Linking astrocyte morphology to function: insights from computational approaches”, GliaLab, Oslo University, Norway, February 2024. ★
- “Dissecting astrocyte function with computational models”, Simula, Numerical Analysis and Scientific Computing (SCAN) department meeting, Oslo, Norway, February 2024. ★
- **A. Denizot**, P. Puchenvov, E. De Schutter. “Linking astrocyte function to cell shape: insights from computational models”, 50th Naito conference, “Glia World - Glial Cells Governing Brain Functions”, Sapporo, Japan, October 2023. †
- “Linking astrocyte nano-morphology to calcium activity at tripartite synapses”, ICVS Satellite Symposium of the ISN-ESN Conference, August 2023, Braga, Portugal. ★
- Tutorial - “Modeling astrocytic calcium signaling”, Annual Computational Neuroscience Meeting, Leipzig, Germany, July 2023. ★
- **A. Denizot**, P. Puchenvov, E. De Schutter. “Computational tools to unravel mechanistic links between intracellular architecture and cell function”, XVI European Meeting on Glial Cells in Health and Disease, GLIA 2023, Berlin, Germany. †
- “Dissecting the functions of astrocyte nano-architecture using voxel-based computational models”, FENS Regional Meeting, May 2023, Algarve, Portugal. ★
- “Linking astrocyte morphology to calcium activity: insights from computational approaches”, CEA Paris-Saclay, site de Fontenay-aux-Roses, MIRCen, April 2023. ★
- **A. Denizot**, M. F. Veloz Castillo, P. Puchenvov, C. Cali, E. De Schutter. “The endoplasmic reticulum in fine astrocytic processes: presence, shape, distribution and effect on Ca²⁺ activity”, Federation of European Neuroscience Societies Forum 2022, Paris, France, July 2022. †
- **A. Denizot**, M. F. Veloz Castillo, C. Cali, E. De Schutter. “Endoplasmic reticulum-plasma membrane contact sites in perisynaptic astrocytic processes: properties and effects”, Neuro2022, The 45th Annual Meeting of the Japan Neuroscience Society, Okinawa, Japan, June 2022. ¶
- “The Endoplasmic Reticulum in Perisynaptic Astrocytic Processes: Properties and Effects”, “All about astrocytes” symposium, organized by Pr. B. Kuhn, Okinawa Institute of Science and Technology, Japan, July 2022. ★
- “Decoding the astrocytic calcium code with computational approaches”, 99th Annual Meeting of the Physiological Society of Japan, Sendai, March 2022. ★
- “Spatially-Extended Simulations Predict the Effect of ER Distribution on Astrocytic Microdomain Ca²⁺ Activity”, 8th ACM International Conference on Nanoscale Computing and Communication Virtual Conference, Sept 2021. <https://bit.ly/2YXwMKq> ★
- **A. Denizot**, M. Arizono, V. U. Nägerl, E. De Schutter, H. Berry. “The nanoscale morphology of astrocyte branchlets governs local calcium activity”, The 44th Annual Meeting of the Japan Neuroscience Society, Kobe Convention Center. July 2021. ¶
- **A. Denizot**, C. Cali, H. Berry, E. De Schutter. “Probing the localization of the endoplasmic reticulum in the gliapil and its effect on astrocytic calcium signals”, XV European Meeting on Glial Cells in Health and Disease, GLIA 2021, July 2021, †
- “Disentangling astrocytic calcium signals: insights from spatially-extended models”, Annual Computational Neuroscience Meeting, online, July 2021. <https://bit.ly/3luuDO1> ★
- “Computational approaches for simulating calcium signals in astrocytes: insights, limitations, challenges and perspectives”, 1st Virtual Conference of the European Society for Neurochemistry “Future perspectives for European neurochemistry – a young scientist’s conference”, May 2021, ¶
- **A. Denizot**, C. Cali, H. Berry, E. De Schutter. “Elucidating the morphology of the endoplasmic reticulum in fine astrocyte branchlets and its effect on calcium signals”, 1st Virtual Conference of the European Society for Neurochemistry “Future perspectives for European neurochemistry – a young scientist’s conference”, May 2021, †

- **A. Denizot**, C. Cali, H. Berry, E. De Schutter. "Elucidating the morphology of the endoplasmic reticulum in fine astrocyte branchlets and its effect on calcium signals", 2021 Virtual Glia Trainee Symposium, March 2021, †
- **A. Denizot**, C. Cali, H. Berry, E. De Schutter. "Effect of the geometry of the endoplasmic reticulum on astrocytic Ca^{2+} signals at tripartite synapses: insights from simulations in realistic 3D geometries", *SfN Global Connectome: A Virtual Event*, January 2021, †
- **A. Denizot**, C. Cali, W. Chen, I. Hepburn, H. Berry, E. De Schutter. "Reaction-diffusion simulations of astrocytic Ca^{2+} signaling in realistic geometries", *Annual Computational Neuroscience Meeting*, July 2020, online, <https://bit.ly/3i1bqzD> <https://bit.ly/367A27E> †
- **A. Denizot**, M. Arizono, W. Chen, I. Hepburn, H. Soula, V. U. Nägerl, E. De Schutter, H. Berry. "Investigating the effect of the nanoscale architecture of astrocytic processes on the propagation of calcium signals", *Annual Computational Neuroscience Meeting*, July 2019, Barcelona, Spain †
- **A. Denizot**, H. Soula, H. Berry, "Simulation of calcium signaling in fine astrocytic processes", *OIST Computational Neuroscience Course*, Okinawa, Japan, July 2018 †
- **A. Denizot**, H. Soula, H. Berry, "Simulation of calcium signaling in fine astrocytic processes: effect of spatial properties on spontaneous activity", *LyonSysBio*, Lyon, France, Nov. 2017 †¶
- **A. Denizot**, H. Soula, H. Berry, "Simulation of calcium signaling in fine astrocytic processes", *OIST Computational Neuroscience Course*, Okinawa, Japan, July 2017 †
- "Towards simulation of calcium signaling in fine astrocytic processes", *International Astrocyte School*, Bertinoro, Italy, March 2017 ¶
- **A. Denizot**, H. Soula, H. Berry, "Simulation of calcium signaling in fine astrocytic processes", *CompSysbio*, Aussois, France, March 2017 †

Conference Organization

- Sept. 2024 "Linking brain structure & function at the nanoscale: an interdisciplinary workshop".
Organizer: **A. Denizot**
Speakers: C. Bosch, C. Cali, C. Chirillo, E. De Schutter, **A. Denizot**, C. Genoud, D. Keller, C. Pape, K. Pernet-Gallay, P. Rangamani, C. Salmon
- July 2021 Annual CNS Meeting, "Computational approaches for studying astrocyte dynamics & astrocyte-neuron communication". <https://astrocytenet.org/cns2021-online-workshop/>
Organizers: B. Genocchi, **A. Denizot**, K. Lenk, S. Nadkarni, M. Taheri
Speakers: Y. Goda, A. Borisyuk, J. Shih, A. Scimemi, G. Yu, L. Heja, A. Pillai, R. Jolivet, M. Collard, **A. Denizot**, R. Refaeli, K. Lenk
- May 2021 1st Virtual Conference of the ESN, "Let's join forces - Bridging the gap between experimental, computational & data sciences to disentangle astrocyte calcium activity"
Speakers: A. Covelo, A. Badoual & **A. Denizot**

Teaching

- 2016-2019 Teaching assistant:** 64h/year to Master students at INSA Lyon & ENS Lyon. Main Subjects: Enzymology (M1), Cellular Biology (M2) & Neurobiology (M2)
- 2017 Private lessons for students preparing competitive exams to enter French Grandes Ecoles
- 2008-2011 Private lessons for high-school students in maths, physics and biology

Supervision

PhD students

- 2023.11-2026 Andréa Ducos 40%** (with Dr. T. Guyet & Dr. H. Berry)
Project Partial differential equation discovery for spatio-temporal simulations in cells
- 2023.10-2026 Schayma Ben Marzougui 50%** (with Dr. H. Berry)
Project Modeling compartmentalized second messenger networks in the retinal growth cones
- 2023.09-2026 Florian Dupeuble 70%** (with Dr. H. Berry)
Project Biophysical modeling of neurovascular coupling at the gliovascular unit

Master students

- 2025.02-06 Zoé Koenig**, INSA Lyon, France. **50%** (with Florian Dupeuble)
Study of the geometrical properties of synapses at the gliovascular unit
- 23.11-24.07 Zoë Laffitte**, UCBL, France. **50%** (with Dr. Jan-Michael Rye)
Implementation of an open-access database of 3D cell meshes for reaction-diffusion simulations
- 2023.04-07 Zoë Laffitte**, UCBL, France. **100%**
Designing an open-access database of 3D cell meshes for reaction-diffusion simulations
- 2023.02-07 Mathieu Chambard**, UCBL, France. **33%** (with Dr. T. Guyet & Dr. H. Berry)
Multiscale Modeling with Partial Differential Equations (PDEs)
- 2021.09-12 Ryo Nakatani**, OIST, Japan. **100%**
Reaction-diffusion modeling of glutamatergic transmission at tripartite synapses
- 2020.10-12 Haruki Shigeta**, Tohoku University, Japan. **100%**
Effect of astrocyte-synapse proximity on glutamate concentration in the synaptic cleft
- 2017.03-07 Carlos Vivar Rios**, Erasmus+ Master student. **50%** (with Dr. H. Berry)
Effect of spatial constraints in realistic 3D meshes of astrocytic processes on Ca^{2+} signals

Community Service

- 2025 Reviewer & member of the scientific committee of the French center for the 3Rs (FC3R), which aims to reinforce the implementation of the 3Rs (Replace, Reduce, Refine) in France through education, promoting responsible and innovative research, and transparent communication.
- 2024 Reviewer at a scientific evaluation panel from the French National Research Agency (ANR)
- 2018-now Reviewer for Cell, PLOS Computational Biology (3), eLife, Communications Biology (2) & Psychoneuroendocrinology
- 2023-now Team representative at the committee of computer resources users (CUMI)
- 2023-2024 Member of the PhD evaluation committee of Den-Whilrex Garcia, Paris-Saclay
- 2023 Member of the 2nd year PhD evaluation committee of Aitakin Ezzati, Université Aix-Marseille
- 2020-2022 Reviewed applications to the OIST Computational Neuroscience Course 2020 & 2022
- 2021-2022 Sustainable Development Goals Advisory Group, OIST, Japan
- 2020-2022 Elected Researcher Representative of the OIST Researcher Community, OIST, Japan

Skills

Biology Neuroscience, Biochemistry, Electrophysiology, Molecular biology, Cellular Biology
Modeling Python, C, ODEs, Monte Carlo
Software/tools Git, L^AT_EX, STEPS, Blender, Trelis

Professional Development

2023 Training on the supervision of doctoral students ; 2 days
2023 Workplace First-Aid Rescuer (SST: Sauveteur Secouriste du Travail) ; 2 days
2023 Mental Health First Aid Rescuer (PSSM: Premiers secours en santé mentale) ; 2 days
2021 Neuromatch Academy: Deep Learning Course ; 3 weeks
2020 Leadership & Management Skills Course for Postdocs, hfp consulting ; 2 weeks
2017 Okinawa Computational Neuroscience Course ; 3 weeks

Outreach

2019-now “Papier-Mâché Sciences” association. <https://papiermachesciences.org>

Member of the board of directors & editorial committee. Goal: explain the content of scientific publications in French & outline the scientific method & publication process.

Responsibilities Author, reviewer, translator, editor, co-head of external communication

2024-2025 “Simuler numériquement le fonctionnement de notre cerveau pour mieux le soigner” conference, Université Ouverte Lyon 1, “Créer des mondes informatiques pour explorer le vivant”, Villeurbanne, France. <https://uo.univ-lyon1.fr/>

2024.11 Journée Filles et informatique : une équation lumineuse, ENS Lyon, France ; speed-meeting with women studying in high school.

2021-2023 “ComSciCon France”. Proofreader & mentor for “Publithon”, where PhD students have to write a scientific article accessible to a large audience. My role was to guide them through the process of scientific writing as well as following editorial guidelines.

2021.07 “Researcher Appreciation Month”, OIST, Japan. Co-organization, presentation of a 3min blitz talk, a poster & art pieces derived from my research.

2020.03 “Researcher Appreciation Week”, OIST, Japan. ‘200s research’ talk & poster session.

2017-2020 “DéMesures” association. <https://demesures.jimdo.com/>

Aim: raising awareness of the importance of scales in science & awakening critical thinking.

Responsibilities Head of collaborations & communication, recruitment manager

Projects

- Founder & co-manager of “Instant Recherche” (researcher interviews)
- Founder & manager of a collaboration with the French radio “Radio Brume” & “Science pour tous” to record podcasts on topics where science and society converge
- Co-manager of the “ArtScience” project
- Led interactive scientific animation: “Fête de la Science” 2017, 2018 & 2019, “GeekTouch” 2017 & 2018, “A Nous de Voir” 2018, “Dans la blouse d’un chercheur” 2018

- Creation of a photo panel on the similarities between science & art
- Co-foundation of the “Cosmograff” project, which presented the Solar System & its scales via a guided walk in Lyon, collaboration with the Musée des Confluences & street artists
- Creation of audio-guides, EWASS annual meeting (astronomy)
- Interview to “Sème ta Science” 2018 to present DéMesures activities

Languages

French	Native
German	Intermediate
Japanese	Intermediate

English	Full professional proficiency
Spanish	Basic
Italian	Basic