

Audrey Denizot

RESEARCH EXPERIENCE

June. 2021-now **JSPS postdoctoral fellow: What are the geometrical factors that regulate the propagation of calcium signals in a single astrocyte?**

Laboratory Computational Neuroscience Unit, Okinawa Institute of Science and Technology, Japan

Supervisor Pr. Erik De Schutter

Jan. 2020-May 2021 **Postdoctoral Scholar: Simulating Ca^{2+} activity in complex perisynaptic astrocytic process meshes extracted from electron microscopy to shed light on the mechanisms regulating signal transmission at tripartite synapses.**

Laboratory Computational Neuroscience Unit, Okinawa Institute of Science and Technology, Japan

Supervisor Pr. E. De Schutter

2016-2019 **PhD: Simulating calcium signaling in fine astrocytic processes** (38 months)

Laboratory Beagle team, INRIA, LIRIS UMR CNRS 5205, Villeurbanne, France

including a 4-month visit to E. De Schutter's unit in OIST, Japan

Supervisors Dr. H. Berry & Pr. H. Soula

Research internships in experimental & computational neuroscience

2016 **Impact of astrocyte reactivity on neuronal communication in the brain** (4 months)

Laboratory INSERM U1215, Neurocentre Magendie, Glia-Neuron Interactions group, Bordeaux

Supervisor Dr. A. Panatier

2015 **Simulations of calcium dynamics in fine astrocytic processes** (4 months)

Laboratory Beagle team, INRIA, LIRIS UMR CNRS 5205, Villeurbanne, France

Supervisors Dr. H. Berry & Pr. H. Soula

2013 **Study of the effect of tianeptine on oligodendrocyte precursor cells in the central nervous system** (4 months)

Laboratory Department of Veterinary Medicine, University of Cambridge, England

Supervisors Dr. R. T. Káradóttir & Dr. H. Gautier

2012 **Identification and biochemical characterization of a new antigenic target of autoimmune limbic encephalitis** (2 months)

Laboratory ONCOFLAM team, INSERM 1028 laboratory, Neuroscience research centre of Lyon, France

Supervisors Dr. E. Sotirakis & Pr. J. Honnorat

EDUCATION & DIPLOMAS

2016-2019 **PhD in computer science**, Laboratoire d'Informatique en Image et Systèmes d'information (LIRIS, computer science laboratory) and Computer Sciences & Maths doctoral school (ED 512 Infomaths), INSA Lyon, France.

Defense: November, 8th 2019

- 2016 Master Biosciences (M.Sc. degree in Biology)**, Ecole Normale Supérieure de Lyon, France (rank 6/54)
- 2014-2015 Préparation à l'agrégation** (teaching diploma which is obtained based on a competitive examination), Ecole Normale Supérieure de Lyon, France. Agrégation obtained (rank 35/1308)
- 2012 License Biosciences (B.Sc. degree in Biology), Ecole Normale Supérieure de Lyon, France
- 2009-2011 Classe préparatoire scientifique (intensive course preparing for the competitive entrance examinations to French Grandes Ecoles), Lycée Carnot, Dijon, France

PUBLICATIONS

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, doi: 10.1002/glia.24258.
- A. Covelo, A. Badoual, [A. Denizot](#). 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. Puchkov, C. Cali, E. De Schutter. The endoplasmic reticulum in perisynaptic astrocytic processes: shape, distribution and effect on calcium activity, *bioRxiv*, 2022, doi:10.1101/2022.02.28.482292v1.

Book chapters

- [A. Denizot](#), H. Berry, and S. Venugopal, Intracellular Calcium Signals in Astrocytes, Computational Modeling of, 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. In *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. In *2021 IEEE 18th International Symposium on Biomedical Imaging (ISBI)* (pp. 135-139). IEEE, April 2021

PRESENTATIONS

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

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 calcium 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. ¶

○ A. Denizot. “Decoding the astrocytic calcium code with computational approaches.”, 99th Annual Meeting of the Physiological Society of Japan, Sendai, March 2022. ★

○ A. Denizot. 8th ACM International Conference on Nanoscale Computing and Communication Virtual Conference, “Spatially-Extended Simulations Predict the Effect of ER Distribution on Astrocytic Microdomain Ca^{2+} Activity”. 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, †

○ A. Denizot. Disentangling astrocytic calcium signals: insights from spatially-extended models. *Annual Computational Neuroscience Meeting*, online meeting, July 2021. <https://bit.ly/3luuDO1> ★

○ A. Denizot. 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 meeting, <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, and H. Berry, Simulation of calcium signaling in fine astrocytic processes, *OIST Computational Neuroscience Course*, Okinawa, Japan, July 2018 †

○ A. Denizot, H. Soula, and 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, and H. Berry, Simulation of calcium signaling in fine astrocytic processes, *OIST Computational Neuroscience Course*, Okinawa, Japan, July 2017 †
- [A. Denizot](#), Towards simulation of calcium signaling in fine astrocytic processes, *International Astrocyte School*, Bertinoro, Italy, March 2017 ¶
- [A. Denizot](#), H. Soula, and H. Berry, Simulation of calcium signaling in fine astrocytic processes, *CompSysbio*, Aussois, France, March 2017 †

CONFERENCE ORGANIZATION

- July 2021** Co-organization of a Workshop at the **Annual Computational Neuroscience Meeting, online meeting**, entitled: **"Computational approaches for studying astrocyte dynamics and astrocyte-neuron communication"**. 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.
<https://astrocytenet.org/cns2021-online-workshop/>
- May 2021** Organization of a Workshop at the 1st **Virtual Conference of the European Society for Neurochemistry "Future perspectives for European neurochemistry – a young scientist's conference"**, May 2021, entitled: **"Let's join forces - Bridging the gap between experimental, computational and data sciences to disentangle astrocyte calcium activity"**. Speakers: A. Covelo, A. Badoual and A. Denizot.

AWARDS & GRANTS

- 2021 Best Poster Award, 1st Virtual Conference of the European Society for Neurochemistry "Future perspectives for European neurochemistry – a young scientist's conference"
- 2021-2023** Recipient of the **Grants-in-Aid for JSPS Research Fellow** (JSPS International Research Fellow) grant; Duration: 2 years; Amount: ≈ €12k €
- 2021-2023** Recipient of the **Postdoctoral Standard Long-term Postdoctoral grant from the Japanese Society for the Promotion of Science** (JSPS, Standard, 21F21733); Duration: 2 years; Amount: ≈ 68k €
- 2020 2020 Trainee Professional Development Award (TPDA), Society for Neuroscience; Amount: \$100
- 2019 Travel award for the annual Computational Neuroscience (CNS) meeting 2019; Amount: \$200
- 2018 Laboratoire d'Informatique en Image et Systèmes d'information International Mobility Grant; Amount: 1000 €
- 2016-2019** **Three year PhD funding by the French Ministry of Superior Education** ("contrat doctoral spécifique pour normalien", CDSN); Amount: ≈ 59k €
- 2011-2016** **State Agent-Student position for excellence** at the Ecole Normale Supérieure de Lyon ("Normalien" grade); Employer: French Ministry of Superior Education; Amount: ≈ 64k €

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

Sept-Dec 2021 **Ryo Nakatani**, 1st year PhD student at the Okinawa Institute of Science and Technology, Japan. **100%**

Project Reaction-diffusion modeling of tripartite synapses to study the modulation of glutamatergic transmission by astrocytes.

Oct-Dec 2020 **Haruki Shigeta**, 3rd year student at the Tohoku University, Japan. **100%**

Project Modeling the effect of astrocyte-synapse proximity on glutamate concentration in the synaptic cleft at tripartite synapses.

Mar-Jul 2017 **Carlos Vivar Rios**, Erasmus+ Master student. **50%** with Hugues Berry.

Project Analyzing the effect of spatial constraints within realistic 3D meshes of astrocytic processes on calcium signals.

SKILLS

Biology Neuroscience, Biochemistry, Electrophysiology, Molecular biology, Cellular Biology

Modeling Python, C, ODEs, Monte Carlo

Software/tools Git, L^AT_EX, Libreoffice, Zotero, Inkscape, GIMP, STEPS, Trelis, Blender

OS LINUX, Windows

PROFESSIONAL NETWORKS

Society for Neuroscience

Organization for Computational Neuroscience (OCNS)

Japan Neuroscience Society

Federation of European Neuroscience Societies

Société des Neurosciences

CAREER DEVELOPMENT

2021 **Neuromatch Academy: Deep Learning Course**. Intensive 3-weeks long online summer school on deep learning. <https://bit.ly/3hqUWU0>

2020 **Leadership & Management Skills Course for Postdocs**, hfp consulting. 21h training on transferable skills in communication, organisation, management & interpersonal relationships.

2017 **Okinawa Computational Neuroscience Course**. Project: "Stochastic simulations of Ca²⁺ nanodomains using STEPS". <https://bit.ly/2YPWv7w>

COMMUNITY SERVICE

2018-now Reviewed articles for PLOS Computational Biology (2), Communications Biology (1) & Psychoneuroendocrinology (1)

2020-2022 Reviewed applications to the OIST Computational Neuroscience Course 2020 & 2022.

- March 2021-now Sustainable Development Goals Advisory Group of the Okinawa Institute of Science and Technology, Japan.
- 2020-2022 Elected Researcher Representative of the OIST Researcher Community, Okinawa Institute of Science and Technology, Japan. <https://bit.ly/33XuPMH>
- 2017 Organizational committee of the European Conference on Artificial Life (ECAL)
- 2017 Recruitment interviews for 1st year students at INSA Lyon, France

OUTREACH

2019-Present "Papier-Mâché Sciences"

Funding member of the association "Papier-Mâché", member of the editorial committee and Board of Directors. The main goal of the association is to develop a website (<https://papiermachesciences.org>) that provides articles explaining the content of scientific publications to the greatest number of people, in French. It also presents the scientific method and the publication system.

<https://bit.ly/3cPnToB>, <https://bit.ly/38KYobu>, <https://bit.ly/2W4vBp1>

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

My article <https://bit.ly/3rQNmFe>

2017-2020 "DéMesures"

<https://bit.ly/2QssoN1>, <https://bit.ly/2qZx4j1>, <https://bit.ly/2OmC7C6>

Member of the French scientific outreach and communication association "DéMesures", former junior laboratory hosted by the ENS Lyon university. The association aims to raise public awareness of the importance of scales in science and humanities and to awaken critical thinking among the young and general public. <https://bit.ly/2KyLg9w>

Responsibilities ○ Head of collaborations and communication

& actions ○ Recruitment manager

- Founder and co-manager of the "Instant Recherche" project, that aims at presenting the daily life of researchers to the general public. <https://bit.ly/2TRYekz>
- Founder and manager of a collaboration with the French radio "Radio Brume" & "Science pour tous", that resulted in 3 podcasts on Science and Society topics. <https://bit.ly/2YJRn03>
- Co-manager of the "ArtScience" project, that combined the work of scientists and artists and resulted in an art exhibition. <https://bit.ly/2OldNR3>
- Led interactive scientific animations at science events & festivals: "Fête de la Science" 2017, 2018 & 2019, "GeekTouch" 2017 & 2018, "A Nous de Voir" 2018.
- Photo panel presenting the similarities between science & art. <https://bit.ly/2XqjaCz>
- Co-creation of the "Cosmograff" project, which presented the Solar System and its scales to the general public via a guided walk in the streets of Lyon, in collaboration with the Musée des Confluences (Lyon Natural History Museum) and a street artist collective <https://bit.ly/35gtYpl>.
- Creation of audio-guides, EWASS annual meeting (astronomy) <https://bit.ly/2rQIB5y>

- Co-organization & animation of "Dans la blouse d'un chercheur", Feb. 2018. This project aims at presenting research to children. <https://bit.ly/2CQpEkS>
- Interview to "Sème ta Science" 2018 to present DéMesures activities. <https://bit.ly/2l5PuFb>

LANGUAGES

French	Native
German	Intermediate
Japanese	Intermediate

English	Full professional proficiency
Spanish	Basic
Italian	Basic