

VIVENTIS DEEP DUAL VIEW LIGHT SHEET MICROSCOPE PUBLICATION LIST

Edition 07/2025

REVEALING LIFE IN ITS FULL CONTEXT

Physiological in toto imaging

This list presents recent publications in the main application areas of light sheet imaging with the Viventis LS1, LS2 and Deep and is updated regularly.

Light sheet microscopy, also known as Selective Plane Illumination Microscopy (SPIM), has emerged as a powerful imaging technique in scientific research, especially for the study of living samples. This non-invasive method combines optical sectioning and low phototoxicity, allowing researchers to visualize biological processes in three dimensions with high spatiotemporal resolution. Over the years, light sheet microscopy has evolved from its early development in the late 1990s to become a cornerstone technique in several fields of study. Light sheet microscopy has transformed our understanding of developmental biology, neurobiology, and cancer research, among others, with unprecedented insights into the dynamic interactions of cells and tissues.

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Oocytes and Embryos Development	3
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Organoids and 3D cell culture

Mechanochemical bistability of intestinal organoids enables robust morphogenesis

Shi-Lei Xue, Qiutan Yang, Prisca Liberali, Edouard Hannezo
Nature Physics (2025). doi.org/10.1038/s41567-025-02792-1
Viventis LS1

Cell heterogeneity and fate bistability drive tissue patterning during intestinal regeneration generation

C. Schwayer, S. Barbiero, D. B. Brückner, C. Baader, N. A. Repina, O. E. Diaz, L. Challet Meylan, V. Kalck, S. Suppinger, Q. Yang, J. Schnabl, U. Kilik, J. G. Camp, B. Stockinger, M. Bühler, M. B. Stadler, E. Hannezo, P. Liberali
BioRxiv (2025). doi.org/10.1101/2025.01.14.632683
Viventis LS1

Coupling of cell proliferation to the segmentation clock ensures robust somite scaling

Marek J. van Oostrom, Yuting I. Li, Wilke H. M. Meijer, Tomas E. J. C. Noordzij, Charis Fountas, Erika Timmers, Jeroen Korving, Wouter M. Thomas, Benjamin D. Simons, Katharina F. Sonnen
BioRxiv (2025). doi.org/10.1101/2025.01.10.632257
Viventis LS1

Mouse liver assembloids model periportal architecture and biliary fibrosis

Anna M. Dowbaj, Aleksandra Sljukic, Armin Niksic, Cedric Landerer, Julien Delpierre, Haochen Yang, Aparajita Lahree, Ariane C. Kühn, David Beers, Helen M. Byrne, Sarah Seifert, Heather A. Harrington, Marino Zerial, Meritxell Huch
Nature (2025). doi.org/10.1038/s41586-025-09183-9
Viventis LS1

Axial patterning of gastruloids via diverse cell type compositions

Kerim Anlas, Fumio Nakaki, Nicola Gritti, Jordi Font-Reverter, Krisztina Arató, Martí Planasdemunt-Hospital, David Oriola, James Sharpe, Vikas Trivedi
BioRxiv (2025). doi.org/10.1101/2025.03.26.645494
Viventis LS1

Fine-tuning mechanical constraints uncouples patterning and gene expression in murine pseudo-embryos

Judith Pineau, Jerome Wong-Ng, Alexandre Mayran, Lucille Lopez-Delisle, Pierre Osteil, Armin Shoushtarizadeh, Denis Duboule, Samy Gobaa, Thomas Gregor
BioRxiv (2025). doi.org/10.1101/2025.01.28.635012
Viventis Deep

The G1/S transition in mammalian stem cells in vivo is autonomously regulated by cell size

Shicong Xie, Shuyuan Zhang, Gustavo de Medeiros, Prisca Liberali, Jan M. Skotheim
BioRxiv (2024). doi.org/10.1101/2024.04.09.588781
Viventis LS1

Morphogenetic constrains in the development of gastruloids: implications for mouse gastrulation

U.M. Fiuza, S. Bonavia, P. Pascual-Mas, G. Torregrosa-Cortés, P. Casaní-Galdón, G. Robertson, A. Dias, A. Martinez Arias
BioRxiv (2024). doi.org/10.1101/2024.12.12.628151
Viventis LS1

Tuft cells act as regenerative stem cells in the human intestine

Lulu Huang, Jochem H Bernink, Amir Giladi, Daniel Krueger, Gijs J F van Son, Maarten H Geurts, Georg Busslinger, Lin Lin, Harry Begthel, Maurice Zandvliet, Christianne J Buskens, Willem A Bemelman, Carmen López-Iglesias, Peter J Peters and Hans Clevers
Nature (2024). doi.org/10.1038/s41586-024-07952-6
Viventis LS1

Mouse neural tube organoids self-organize floorplate through BMP-mediated cluster competition

Teresa Krammer, Hannah T. Stuart, Elena Gromberg, Keisuke Ishihara, Dillon Cislo, Manuela Melchionda, Fernando Becerril Perez, Jingkui Wang, Elena Costantini, Stefanie Lehr, Laura Arbanas, Alexandra Hormann, Ralph A. Neumuller, Nicola Elvassore, Eric Siggia, James Briscoe, Anna Kicheva and Elly M. Tanaka
Developmental Cell (2024). doi.org/10.1016/j.devcel.2024.04.021
Viventis LS1

NOTCH-driven oscillations control cell fate decisions during intestinal homeostasis

Sonja D. C. Weterings¹, Hiromune Eto¹, Jan-Daniël de Leede, Amir Giladi, Mirjam E. Hoekstra, Wouter F. Beijk, Esther J. M. Liefing, Karen B. van den Anker, Jacco van Rheenen, Alexander van Oudenaarden and Katharina F. Sonnen

BioRxiv (2024). doi.org/10.1101/2024.08.26.609553

Viventis LS1

Control of lumen geometry and topology by the interplay between pressure and cell proliferation rate in pancreatic organoids

Byung Ho Lee, Kana Fuji, Heike Petzold, Phil Seymour, Siham Yennek, Coline Schewin, Allison Lewis, Daniel Riveline, Tetsuya Hiraiwa, Masaki Sano and Anne Grapin-Botton

BioRxiv (2024). doi.org/10.1101/2024.05.29.596462

Viventis LS1

The G1/S transition in mammalian stem cells in vivo is autonomously regulated by cell size

Shicong Xie, Shuyuan Zhang, Gustavo de Medeiros, Prisca Liberali and Jan M. Skotheim

BioRxiv (2024). doi.org/10.1101/2024.04.09.588781

Viventis LS1

Open top multi sample dual view light sheet microscope for live imaging of large multicellular systems

Franziska Moos, Simon Suppinger, Gustavo de Medeiros, Koen Cornelius Oost, Andrea Boni, Camille Rémy, Sera Lotte Weevers, Charisios Tsiarlis, Petr Strnad and Prisca Liberali

Nature Methods (2024). doi.org/10.1038/s41592-024-02213-w

Viventis Deep

Decoding morphogen patterning of human neural organoids with a multiplexed single-cell transcriptomic screen

Fátima Sanchís-Calleja, Akanksha Jain, Zhisong He, Ryoko Okamoto, Charlotte Rusimbi, Pedro Rifes, Gaurav Singh Rathore, Malgorzata Santel, Jasper Janssens, Makiko Seimiya, Jonas Simon Fleck, Agnete Kirkeby, J. Gray Camp and Barbara Treutlein

BioRxiv (2024). doi.org/10.1101/2024.02.08.579413

Viventis LS1

Integrating single-cell imaging and RNA sequencing datasets links differentiation and morphogenetic dynamics of human pancreatic endocrine progenitors

Belin Selcen Beydag-Tasöz, Joyson Verner D'Costa, Lena Hersemann, Byung Ho Lee, Federica Luppino, Yung Hae Kim, Christoph Zechner, Anne Grapin-Botton

Developmental Cell (2023). doi.org/10.1016/j.devcel.2023.07.019

Viventis LS1

Dynamics and plasticity of stem cells in the regenerating human colonic epithelium

Koen C. Oost, Maurice Kahnwald, Silvia Barbiero, Gustavo de Medeiros, Simon Suppinger, Veronique Kalck, Ludivine Challet Meylan, Sebastien A. Smallwood, Michael B. Stadler, Prisca Liberali

BioRxiv (2023). doi.org/10.1101/2023.12.18.572103

Viventis LS1

Morphodynamics of human early brain organoid development

Akanksha Jain, Gilles Gut, Fátima Sanchís-Calleja, Ryoko Okamoto, Simon Streib, Zhisong He, Fides Zenk, Malgorzata Santel, Makiko Seimiya, René Holtackers, Sophie Martina Johanna Jansen, J. Gray Camp, Barbara Treutlein

BioRxiv (2023). doi.org/10.1101/2023.08.21.553827

Viventis LS1

Topological morphogenesis of neuroepithelial organoids

Keisuke Ishihara, Arghyadip Mukherjee, Elena Gromberg, Jan Brugués, Elly M Tanaka, Frank Jülicher

Nature Physics (2022). doi.org/10.1038/s41567-022-01822-6

Viventis LS1

Multiscale light-sheet organoid imaging framework

Gustavo de Medeiros, Raphael Ortiz, Petr Strnad, Andrea Boni, Franziska Moos, Nicole Repina, Ludivine Challet Meylan, Francisca Maurer, Prisca Liberali

Nature Communication (2022). doi.org/10.1038/s41467-022-32465-z

Viventis LS1

Cell fate coordinates mechano-osmotic forces in intestinal crypt formation

Qiutan Yang, Shi-Lei Xue, Chii Jou Chan, Markus Rempfler, Dario Vischi, Francisca Maurer Gutierrez, Takashi Hiiragi, Edouard Hannezo, Prisca Liberali

Nature cell Biology (2021). doi.org/10.1038/s41556-021-00700-2

Viventis LS1

Lineage recording in human cerebral organoids

Zhisong He, Ashley Maynard, Akanksha Jain, Tobias Gerber, Rebecca Petri, Hsiu-Chuan Lin, Malgorzata Santel, Kevin Ly, Jean-Samuel Dupré, Leila Sidow, Fatima Sanchis Calleja, Sophie M J Jansen, Stephan Riesenberger, J Gray Camp, Barbara Treutlein
Nature Methods (2021). doi.org/10.1038/s41592-021-01344-8
Viventis LS1

Tissue Engineering with Mechanically Induced Solid-Fluid Transitions

Erik Mailand, Ece Özelçi, Jaemin Kim, Matthias Rüegg, Odysseas Chaliotis, Jon Märki, Nikolaos Bouklas, Mahmut Selman Sakar
Ad. Materials (2021). doi.org/10.1002/adma.202106149
Viventis LS1

Capturing Cardiogenesis in Gastruloids

Giuliana Rossi, Nicolas Broguiere, Matthew Miyamoto, Andrea Boni, Romain Guiet, Mehmet Girgin, Robert G Kelly, Chulan Kwon, Matthias P Lutolf
Cell Stem Cell (2021). doi.org/10.1016/j.stem.2020.10.013
Viventis LS1

Self-organization and symmetry breaking in intestinal organoids development

Denise Serra, Urs Mayr, Andrea Boni, Ilya Lukonin, Markus Rempfler, Ludvine Challet Meylan, Michael B Stadler, Petr Strnad, Panagiotis Papasaikas, Dario Vischi, Annick Waltdt, Guglielmo Roma, Prisca Liberali
Nature (2019). doi.org/10.1038/s41586-019-1146-y
Viventis LS1

Oocytes and Embryos Development

Early coordination of cell migration and cardiac fate determination during mammalian gastrulation

Shayma Abukar, Peter A Embacher, Alessandro Ciccarelli, Sunita Varsani-Brown, Isabel G W North, Jamie A Dean, James Briscoe, and Kenzo Ivanovitch
Embo Journal (2025). doi.org/10.1038/s44318-025-00441-0
Viventis LS1

Inverse blebs operate as hydraulic pumps during mouse blastocyst formation

Markus F Schliffka, Julien G Dumortier, Diane Pelzer, Arghyadip Mukherjee, Jean-Léon Maître
Nature Cell Biology (2024). doi.org/10.1038/s41556-024-01501-z
Viventis LS1

Spatio-temporal requirements of Aurora kinase A in mouse oocytes meiotic spindle building

Cecilia S. Blengini, Michaela Vaskovicova, Jan Schier, David Drutovic and Karen Schindler
iScience (2024). doi.org/10.1016/j.isci.2024.110451
Viventis LS1

Live imaging human embryos reveals mitotic errors and lineage specification prior to implantation

ed Abdelbaki, Afshan McCarthy, Anita Karsa, Leila Muresan, Kay Elder, Athanasios Papatathanasiou, Phil Snell, Leila Christie, Martin Wilding, Benjamin J. Steventon, Kathy K. Niakan
BioRxiv (2024). doi.org/10.1101/2024.09.26.614906
Viventis LS1 and Viventis Deep

Reconstitution of chromatin reorganization during mammalian oocyte development

Jing Wang, Wang Li, Jing Guo, Xiaoming Xu, Ge Lin, Bin Li, Chun So
BioRxiv (2024). doi.org/10.1101/2024.07.27.605426
Viventis Deep

CHK1-CDC25A-CDK1 regulate cell cycle progression and protect genome integrity in early mouse embryos

Lucie Knoblochova, Tomas Duricek, Michaela Vaskovicova, Chrysoula Zorzompokou, Diana Rayova, Ivana Ferencova, Vladimir Baran, Richard M Schultz, Eva R Hoffmann and David Drutovic
Embo Reports (2023). doi.org/10.15252/embr.202256530
Viventis LS1

Actin-driven chromosome clustering facilitates fast and complete chromosome capture in mammalian oocytes

Katarina Harasimov, Julia Uraji, Eike Urs Mönnich, Zuzana Holubcová, Kay Elder, Martyn Blayney, Melina Schuh
Nature Cell Biology (2023). doi.org/10.1038/s41556-022-01082-9
Viventis LS1

Cell fragmentation in mouse preimplantation embryos induced by ectopic activation of the polar body extrusion pathway

Diane Pelzer, Ludmilla de Plater, Peta Bradbury, Adrien Eichmuller, Anne Bourdais, Guillaume Halet, and Jean-Léon Maître
Embo Journal (2023). doi.org/10.15252/emboj.2023114415
Viventis LS1

Mechanism of spindle pole organization and instability in human oocytes

Chun So, Katerina Menelaou, Julia Uraji, Katarina Harasimov, Anna M Steyer, K Bianka Seres, Jonas Bucevičius, Gražvydas Lukinavičius, Wiebke Möbius, Claus Sibold, Andreas Tandler-Schneider, Heike Eckel, Rüdiger Moltrecht, Martyn Blayney, Kay Elder, Melina Schuh
Science (2022). doi.org/ 10.1126/science.abj3944
Viventis LS1

Aurora kinase A is essential for meiosis in mouse oocytes

Cecilia S Blengini, Patricia Ibrahimian, Michaela Vaskovicova, David Drutovic, Petr Solc, Karen Schindler
Plos Genetics (2021). doi.org/10.1371/journal.pgen.1009327
Viventis LS1

Hydraulic fracturing and active coarsening position the lumen of the mouse blastocyst

Julien G Dumortier, Mathieu Le Verge-Serandour, Anna Francesca Tortorelli, Annette Mielke, Ludmilla de Plater, Hervé Turlier, Jean-Léon Maître
Science (2019). doi.org/ 10.1126/science.aaw7709
Viventis LS1

Primed Track, high-fidelity lineage tracing in mouse pre-implantation embryos using primed conversion of photoconvertible proteins

Maaïke Welling, Manuel Alexander Mohr, Aaron Ponti, Lluc Rullan Sabater, Andrea Boni, Yumiko K Kawamura, Prisca Liberali, Antoine Hfm Peters, Pawel Pelczar, Periklis Pantazis
(Elife 2019). doi.org/10.7554/eLife.44491
Viventis LS1 (not cited in the article)

 Zebrafish Research

LiverZap: a chemoptogenetic tool for global and locally restricted hepatocyte ablation to study cellular behaviours in liver regeneration

Elizabeth M G Ambrosio, Charlotte S L Bailey, Iris A Unterweger, Jens B Christensen, Marcel P Bruchez, Pia R Lundegaard, Elke A Ober Development (2024). doi.org/10.1242/dev.202217
Viventis LS1

Cell-autonomous generation of the wave pattern within the vertebrate segmentation clock

Laurel A Rohde, Arianne Bercowsky-Rama, Guillaume Valentin, Sundar Ram Naganathan, Ravi A Desai, Petr Strnad, Daniele Soroldoni, Andrew C Oates
Elife (2024). doi.org/10.7554/eLife.93764.2
Viventis LS1

Clock driven waves of Tbx6 expression prefigure somite boundaries

Olivier F. Venzin, Chloé Jollivet, Nicolas Chiaruttini, Olga Rossopoff, Clément Helsens, Luis G. Morelli, Koichiro Uriu, Andrew C. Oates
BioRxiv (2023). doi.org/10.1101/2023.11.09.566373
Viventis LS1

Deconstructing body axis morphogenesis in zebrafish embryos using robot-assisted tissue micromanipulation

Ece Özelçi, Erik Mailand, Matthias Rüegg, Andrew C Oates, Mahmut Selman Sakar
Nature Communications (2022). doi.org/10.1038/s41467-022-35632-4
Viventis LS1

Left-right symmetry of zebrafish embryos requires somite surface tension

Sundar R Naganathan, Marko Popović, Andrew C Oates
Nature (2022). doi.org/10.1038/s41586-022-04646-9
Viventis LS1

Mitochondria in Embryogenesis: An Organellogenesis Perspective

Yoan Arribat, Dogan Grepper, Sylviane Lagarrigue, Joy Richard, Mélanie Gachet, Philipp Gut, Francesca Amati
Frontiers in Cell and Developmental Biology (2019). doi.org/10.3389/fcell.2019.00282
Viventis LS1

Marine Organisms

Mechanochemical patterning localizes the organizer of a luminal epithelium

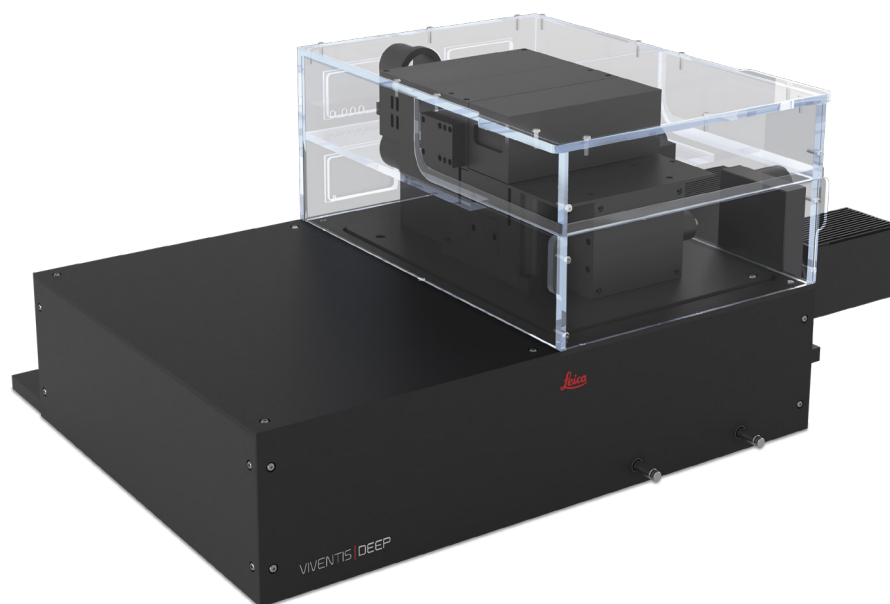
Sera L. Weever, Alistair D. Falconer, Moritz Mercker, Hajar Sadeghi, David Rozema, Jaroslav Ferenc, Jean-Leon Maître, Albrecht Ott, Dietmar B. Oelz, Anna Marciniak-Czochra, Charisios D. Tsiarris
ScienceAdvances (2025). doi: 10.1126/sciadv.adu2286
Viventis Deep

Life-cycle-coupled evolution of mitosis in close relatives of animals

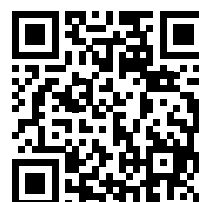
Hiral Shah, Marine Olivetta, Chandni Bhickta, Paolo Ronchi, Monika Trupinić, Eelco C Tromer, Iva M Tolić, Yannick Schwab, Omayya Dudin, Gautam Dey
Nature (2024). doi.org/10.1038/s41586-024-07961-5
Viventis LS1

The nuclear to cytoplasmic ratio drives cellularization in the close animal relative *Sphaeroforma arctica*

Marine Olivetta, Omayya Dudin
Current Biology (2023). doi.org/10.1016/j.cub.2023.03.019
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