

# PICKCELL

**Stem from joint NUS/Mechanobiology Institute and CNRS's patented device, Pickcell Lab aims to develop a range of versatile, low cost and easy to use micro-consumables for the 3D cell culture.**

Pickcell Lab Pte Ltd was incorporated in Singapore in July 2016 and is the result of the collaboration between the **French Biotech Company Builder Quattrocento** and the joint NUS-Mechanobiology Institute and CNRS lab's research team.

The core technology consists in a bio compatible membrane with through-holes that can be placed on any substrate to create artificial micro-niches for 3D cell culture. Its novelty resides in 3 main aspects:

- ➔ **It is fully customizable and combinatorial to mimic in-vitro, in-vivo micro-environments for cell culture, at a degree of precision yet never reached.**
- ➔ **Its optical index matching composition allows super high resolution microscopy.**
- ➔ **It is stackable.**

Our products, currently in their prototype phase, consist in a set of three systems based on that core technology offering various degrees of control over cell culture.



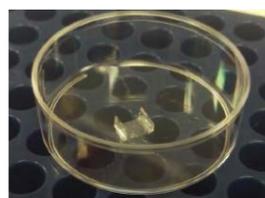
**Quattrocento is 20% funded and owned by French Tech Accélérateur, a publicly funded initiative to promote French start-ups under a single brand in France and abroad.**

Quattrocento's strategy is to identify and evaluate innovative technology projects before speeding up their development with financial and managerial resources. For each project carried out, Quattrocento creates a subsidiary. Starting with academic researchers, a full "project team" is set up with all the necessary skills for start-up: marketing, management, product development and science. Quattrocento funds and operationally manages its subsidiaries during the early-stage phase, from idea to prototype, then drives project deployment from industrialization to product marketing.

# Membwell

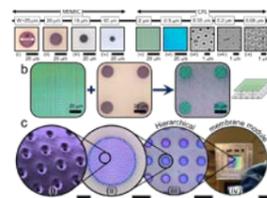
A fully controllable micro-environment for 3D cell culture that offers a very universal and versatile way to control cell microenvironment at the single cell level in standard cell culture dishes.

### STACKABLE & REMOVABLE IN STANDARD PETRI DISHES



- Mounted in standard PD
- Peelable for collection
- Compatible multiwell plates

### USER DEFINED SHAPE & CAVITIES SIZE



- Cavity size from 5 μm to 1 mm
- Thickness from 1 μm to 1 mm
- Multiple shape and aspect ratio

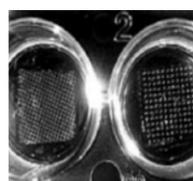
### OPTIMIZED FOR HIGH RESOLUTION MICROSCOPY



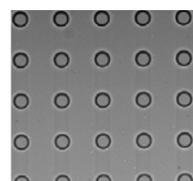
- Optically matched with culture medium
- Non distorted confocal image 100X
- Super-res 3D enabled (Option)

Its current applications and publications are in the cellular biology, biophysics and mechanobiology for any biochemical, rheology, topography environment can be reproduced in a combinatorial manner.

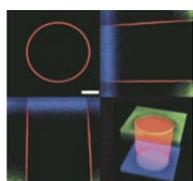
**Membwell's versatility, ease of use and low cost makes it the perfect generic consumable for all sorts of use and experiments in Immunology, Oncology, Embryology and Molecular Biology.**



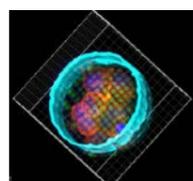
Top view of a Membwell in a 3.5cm Petri Dish



Top view of a Membwell area with 25 microwells (20μm diameter well)



3D stacks of one microwell with 3D protein custom coating:  
Top: BSA-Alexa488  
Side: BSA-Alexa655  
Bottom: BSA-Alexa633



Individual seeded well 3D cropped view

# Migration Assay

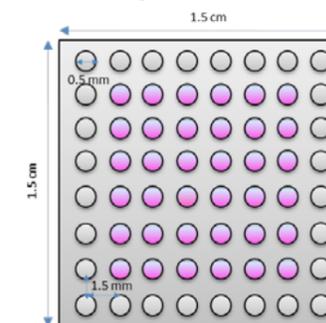
A more specialized derivative of this technology offers the ability to trace and sort cells in these environments, based on their migration properties and to collect them intact and alive in large quantities amenable for subsequent genomic screening.

It consists in stacked Membwells that can be peeled-off layer by layer to collect the cells that have migrated out of the microwells. Experiments show that cells sorted on their migration speed and behavior present similar phenotypes.

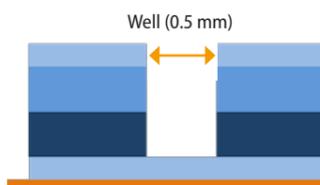
**This simple and cost effective approach opens wide possibilities of high throughput live and intact cell sorting for subsequent screening or experiments such as drug screening per cell population.**

Existing migration assays do not offer live and intact cell retrieval or involve the use of chemoattractant which create bias in the experiments and are ultimately more expensive and complex to operate.

### PRINCIPLE

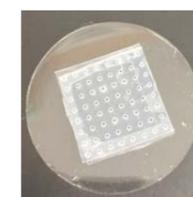


Seeded cells in 36 wells / platform

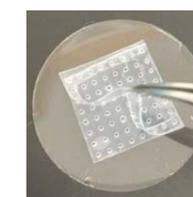


- Cell seeding layer (125 μm)
- Top layer (125 μm)
- Spacer (250 μm)
- Bottom Layer (250 μm)
- Petri Dish

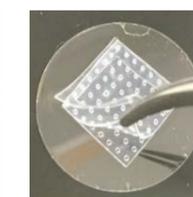
### EXISTING PROTOTYPE FORMAT



Device



Seeding layer

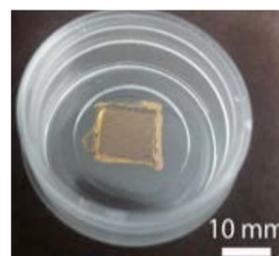


Top layer

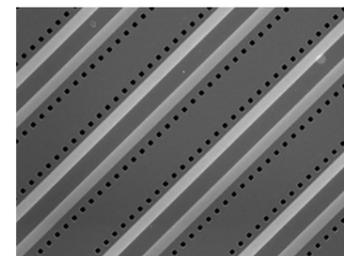
# SoSpim

**That second derivative of Membwell couples optics to the environmental chambers to enable high and super resolution imaging of the cells in the in-vitro environment with unsurpassed resolution.**

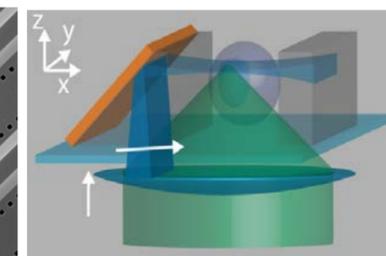
Each of the Membwell's micro-cavities is flanked with mirrors for Selective Plane Illumination through a single Objective: SPIM



- Sterile, disposable, cell culture enabled
- Same properties as Membwell



Microfabricated cavities with any size ranging from 10 μm to 1mm



Side reflection on mirror ensure transverse illumination

This chip is a proprietary consumable of the new SPIM Super Microscope add-on developed jointly by NUS/Mechanobiology Institute and Institut Interdisciplinaires des Neuro Sciences (CNRS) Bordeaux.

**SoSpim is the only SPIM-ready single cell microenvironment: it offers unreached yet exploration capabilities of living cells directly within their culture environment.**

## PICKCELL LAB'S TEAM



**Anne Lehman, CEO**  
*Director & Founder*

Anne Lehman is the Founder and Director of LMB Housing Services Pte Ltd created in 2006 which since became the first Corporate Housing supplier in Singapore. She received the Spirit of Enterprise Award in 2015. Prior to that, she led a wide sales career in the IT industry in France, notably with Microsoft France as a Sales Specialist in the new Business Solution Division and Siebel System. She holds a Bachelor Degree of the MBA Institute in Paris.



**Bertrand Fourquet**  
*Director & Founder (through Quattrocento S.A.S)*

Bertrand Fourquet is the founder and Chairman of Quattrocento S.A.S, a French Biotech Company Builder focusing on the Industrial management of Life Sciences innovations from invention to commercialization. He founded (2001) and directed Echosens, an innovative medical device company in hepatology acquired in June 2011 by the Chinese pharmaceutical group Furui. Prior to that, he created the Spanish subsidiary of the Distriborg group (organic food in supermarkets) and he ran a Spanish company for trading with large retailers. Bertrand Fourquet began his career in mergers and acquisitions at Lazard Frères (New York) and graduated from Essec Business School and holds a Bachelor Degree in physics.

## SCIENTIFIC TEAM



**VIASNOFF Virgile**  
*Associate Prof at MechanoBiology Institute at NUS Singapore and Directeur de recherche CNRS. Founding Partner.*

Virgile Viasnoff is the inventor of the patents licensed by Pickcell Lab. He is involved in the development of all applications pertaining to his inventions through Research Collaborative Agreements signed between Quattrocento's subsidiaries, including Pickcell Lab, and the MechanoBiology Institute. He handles the scientific supervision of Pickcell's scientific team deployed in MBI.

### PUBLICATIONS



**Actin dynamics modulate mechanosensitive immobilization of E-cadherin at adherens junctions**

W. Engl<sup>1</sup>, B. Arasi<sup>1</sup>, L. L. Yap<sup>2</sup>, J. P. Thiery<sup>1,2,3,5</sup> and V. Viasnoff<sup>1,4,5,6</sup>



**Easy Fabrication of Thin Membranes with Through Holes. Application to Protein Patterning**

Thomas Masters, Wilfried Engl, Zhe L. Weng, Bakya Arasi, Nils Gauthier, Virgile Viasnoff



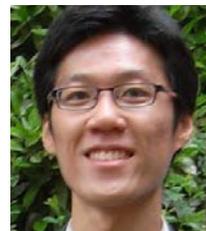
**Extracellular matrix scaffolding guides lumen elongation by inducing anisotropic intercellular mechanical tension**

Qiusi Li<sup>1,8</sup>, Yue Zhang<sup>1,8</sup>, Perrine Pluchon<sup>2</sup>, Jeremy Robens<sup>1</sup>, Keira Herr<sup>3</sup>, Myriam Mercade<sup>4</sup>, Jean-Paul Thiery<sup>3</sup>, Harry Yu<sup>1,5,6,9</sup> and Virgile Viasnoff<sup>1,2,3,7,9,10</sup>



**LOW Hong Yee**

Associate Prof at Singapore University of Design and Technology in the cluster of Engineering Product Development. Founding Partner. Prof Low leads the research and the development of the production tool that produces Pickcell Lab's core product. She is involved into the new products' production challenges through a Research Collaborative Agreement between Pickcell Lab and SUTD.



**WONG Him Cheng**

Engineering Product Development Research Fellow (SUTD). Founding Partner. Developed fabrication methodologies, co-designed and commissioned a prototype Roll-to-Roll production unit for Membwell technology.



**GRENCI Gianluca**

Senior Research Fellow at MechanoBiology Institute at NUS Singapore and head of the Micro Fabrication Core facility. Founding Partner. Dr Grenco's will provide his expertise in nano and micro fabrication of Pickcell's device as part of the Research Collaborative Agreement established between our two entities.