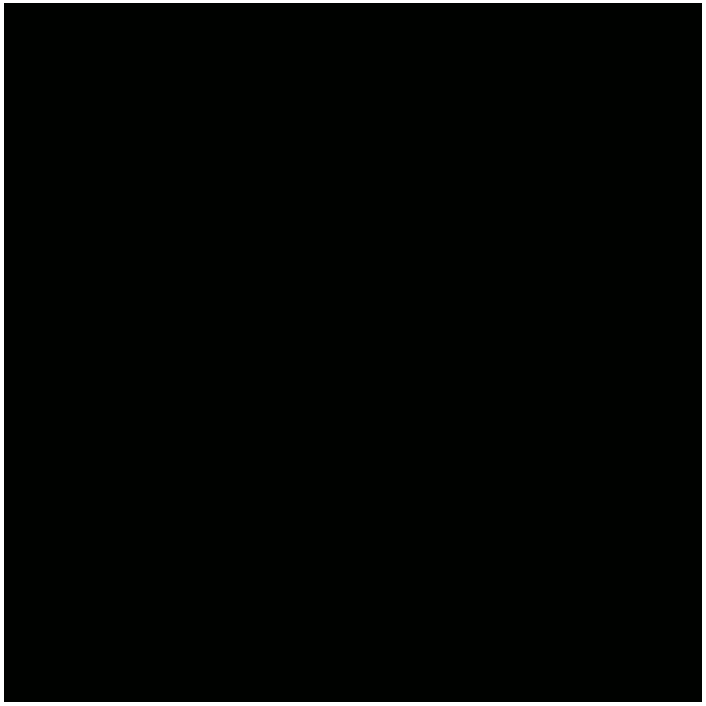
MicroVIP : Simulateur de microscopie sur VIP



Contexte et motivation

PRO Chip

INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES LYON

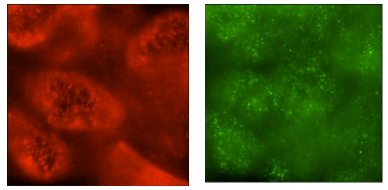
UNIVERSITÀ DI TRENTO

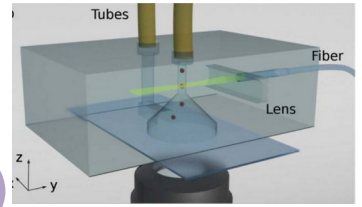
Imperial College London

LARIS

CNR IFN Istituto di Fotonica e Nanotecnologie

ELVESYS MICROFLUIDICS INNOVATION CENTER





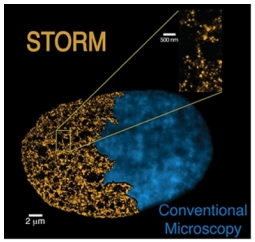
Microfluidique: Vitesse des cellules?

Microscope: WF, CF, LS, SIM?

Fluorophore?

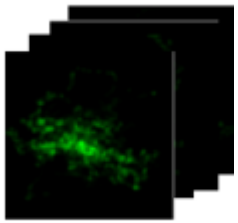
Features texturales ou pointillistes ?

Expérience microscopie



Resolution: SR or LR?

Objectif: NA, magnification,..?



2D or 3D?

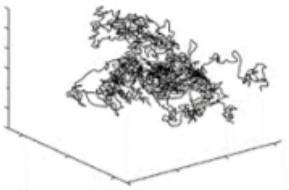
Fonctionnement du simulateur

Paramètres ADN / fluorophores

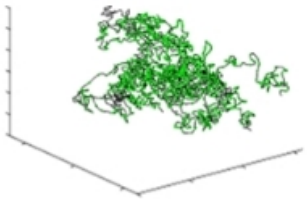
Paramètres Microsocope

Hyperparamètres Extraction

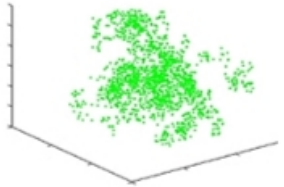
Module 1: Vérité terrain → **Module 2: Acquisition de l'image** → **Module 3: Extraction de features**



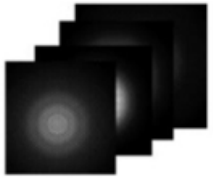
a) Chromatine



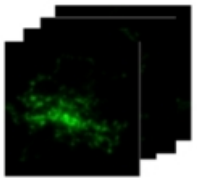
b) Fluorophores



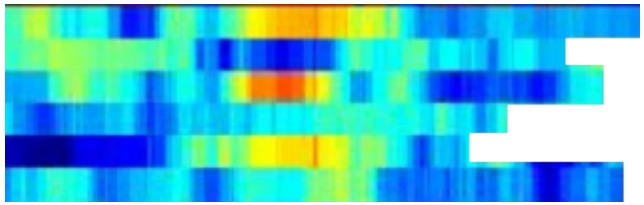
c) Nuage de points 3D



d) microscope



e) Image 3D

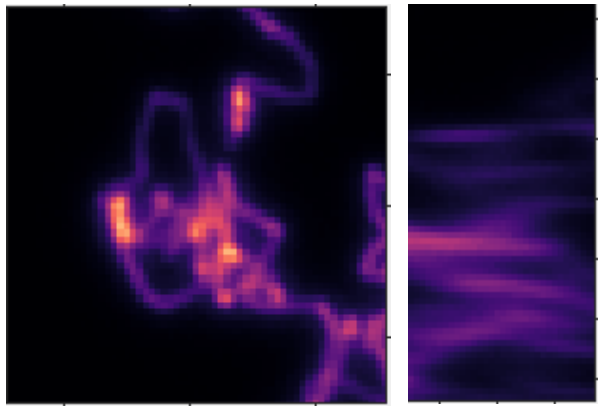


f) Vecteurs de features

Exemples d'images simulées

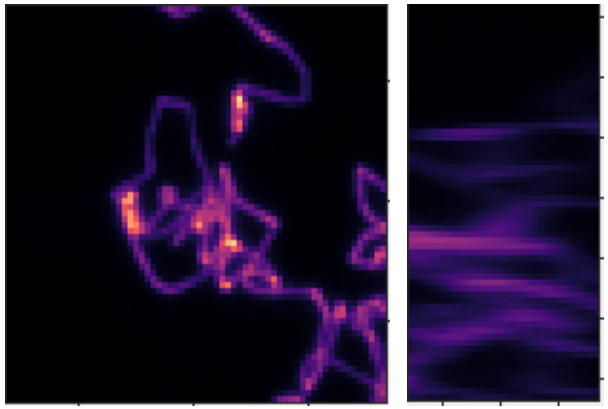
Objectif : 40x, eau (n=1.33), NA 0.95, longueur d'onde d'émission 561 nm

Widefield



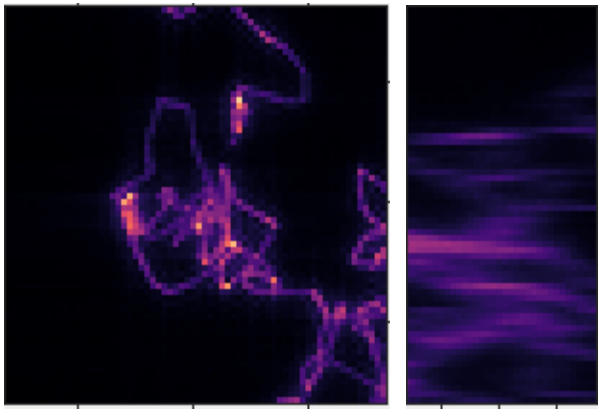
Sum Z- projection Sum X- projection

Confocal



Sum Z- projection Sum X- projection

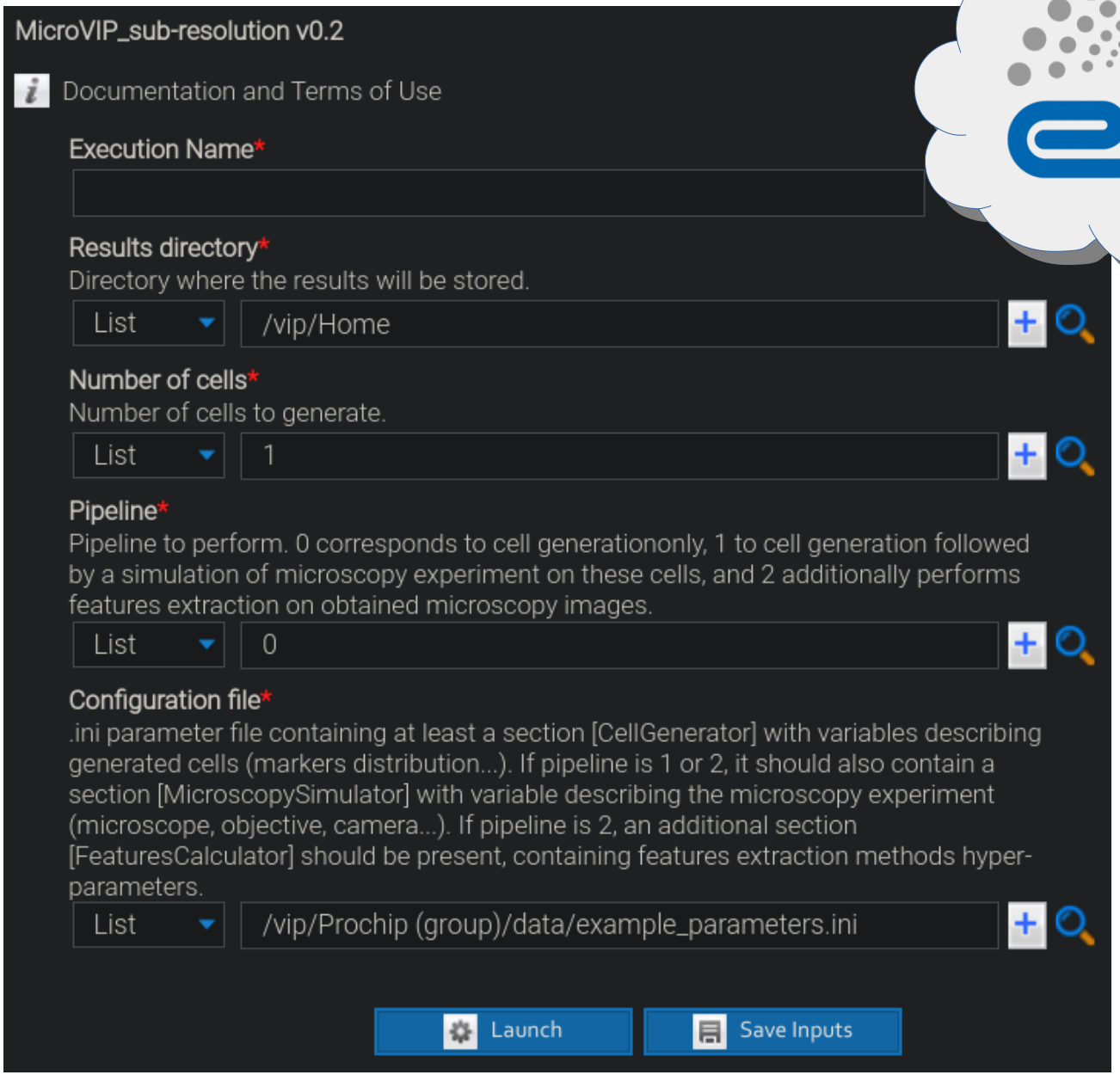
2 Beam Structured Illumination Microscopy (SIM)



Sum Z- projection Sum X- projection

** Only two chromatin chains are used as object input – Zoom x3 for better differences visualization

Dans VIP


MicroVIP_sub-resolution v0.2
Documentation and Terms of Use
Execution Name*
Results directory*
Directory where the results will be stored.
List
/vip/Home
Number of cells*
Number of cells to generate.
List
1
Pipeline*
Pipeline to perform. 0 corresponds to cell generationonly, 1 to cell generation followed by a simulation of microscopy experiment on these cells, and 2 additionally performs features extraction on obtained microscopy images.
List
0
Configuration file*
.ini parameter file containing at least a section [CellGenerator] with variables describing generated cells (markers distribution...). If pipeline is 1 or 2, it should also contain a section [MicroscopySimulator] with variable describing the microscopy experiment (microscope, objective, camera...). If pipeline is 2, an additional section [FeaturesCalculator] should be present, containing features extraction methods hyper-parameters.
List
/vip/Prochip (group)/data/example_parameters.ini
Launch
Save Inputs

Tutoriel ISBI 2021

#3. A review of image annotation, augmentation and synthesis approaches for accelerating supervised machine learning in bioimaging

by D. Rousseau (LARIS, Université d'Angers, France), A. Ahmad (CREATIS, INSA Lyon, France) and N. Debs (CREATIS, Université de Lyon, France)

https://www.creatis.insa-lyon.fr/~vanel/ISBIhandsonMicroVIP.mp4

Applications

Detecting Differences of Fluorescent Markers Distribution in Single Cell Microscopy: Textural or Pointillist Feature Space?

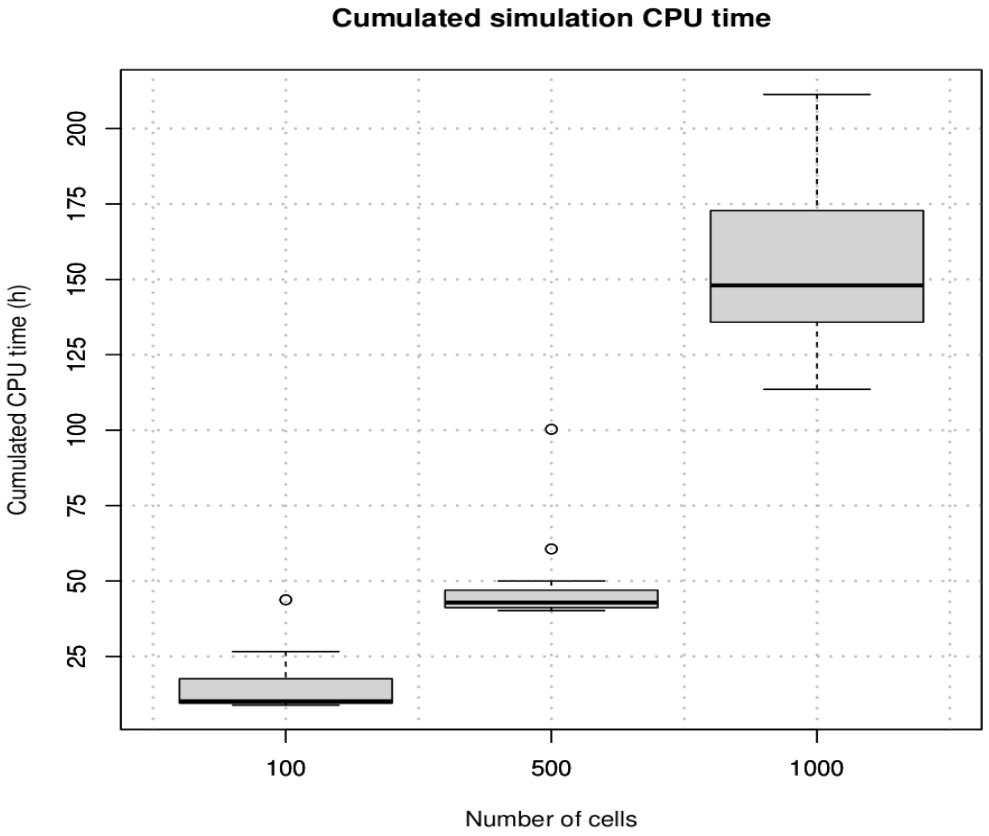
Ali Ahmad[1,2], Carole Frindel[2] and David Rousseau[1*]

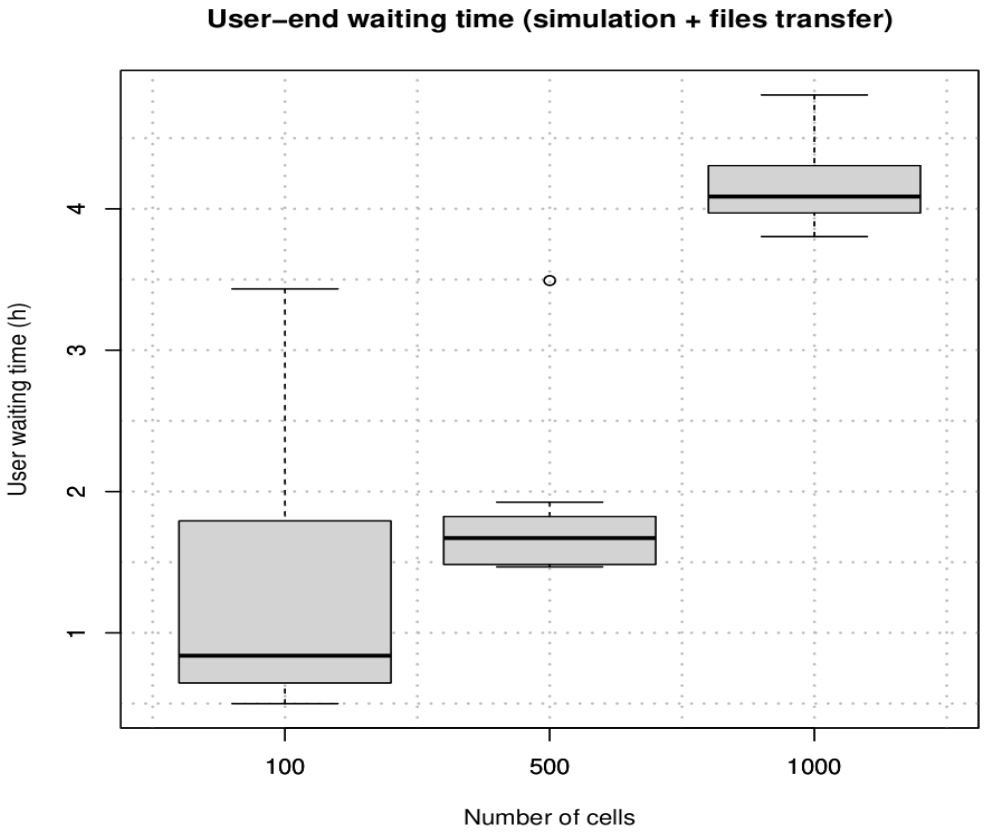
[1]Laboratoire Angevin de Recherche en Ingénierie des Systèmes, UMR INRAE IRHS, Université d'Angers, Angers, France
[2]Centre de Recherche en Acquisition et Traitement de l'Image pour la Santé, CNRS UMR 5220-INSERM U1206, Université Lyon 1, INSA de Lyon, Lyon, France

Influence of Motion-Blur in Single Cell Image Analysis via Microfluidic Microscopy

Auteurs	D. Rousseau A. Ahmad, G. Vanel, C. Frindel
Date de publication	2021
Conférence	24th Conference Focus on Microscopy

Temps d'exécutions





A retenir

MicroVIP c'est :

- Un simulateur centralisé et personnalisable
- Simple d'utilisation sans installation
- Génération rapide à bas coût
- Des images annotées

https://www.creatis.insa-lyon.fr/site7/en/MicroVIP