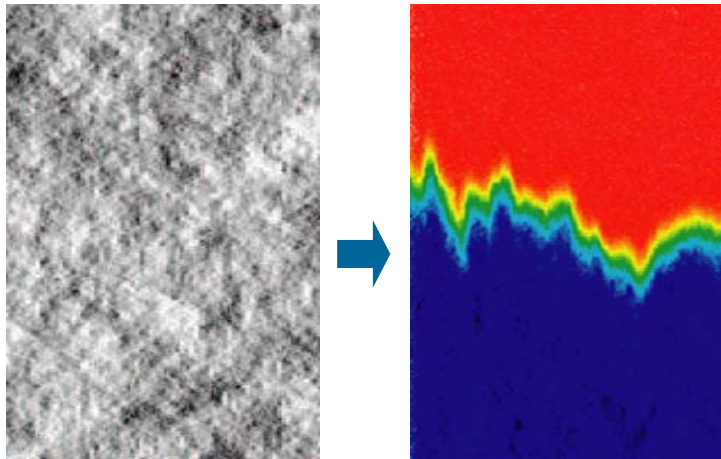


Transporte y dispersión en fracturas



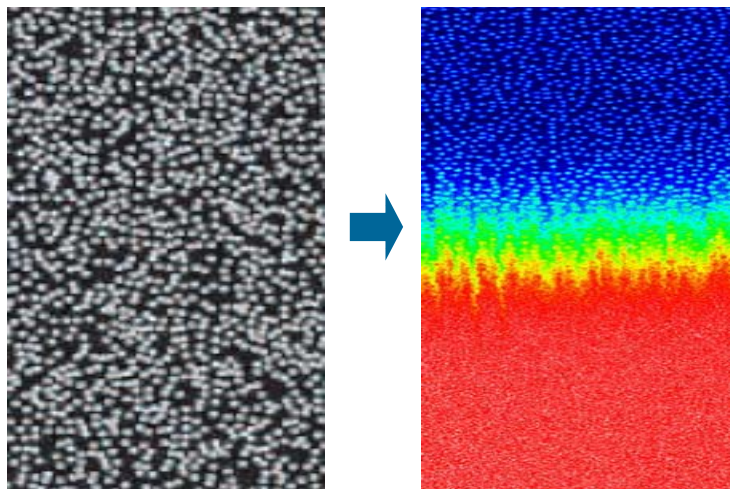
Fractura a paredes con rugosidad autoafín

Estudiamos las propiedades de transporte y dispersión en el flujo de

- Soluciones newtonianas
- Soluciones poliméricas no newtonianas
- Suspensiones de partículas

en fracturas cuyas paredes tienen diferentes tipos de rugosidad:

- lisa
- aleatoria
- autoafín

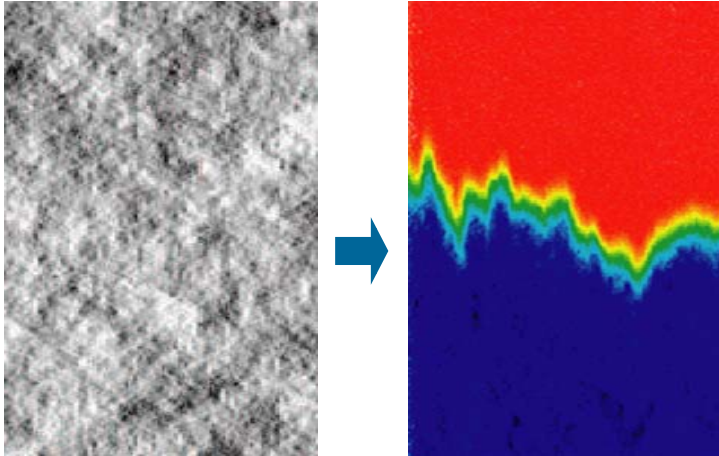


Fractura a paredes con rugosidad aleatoria

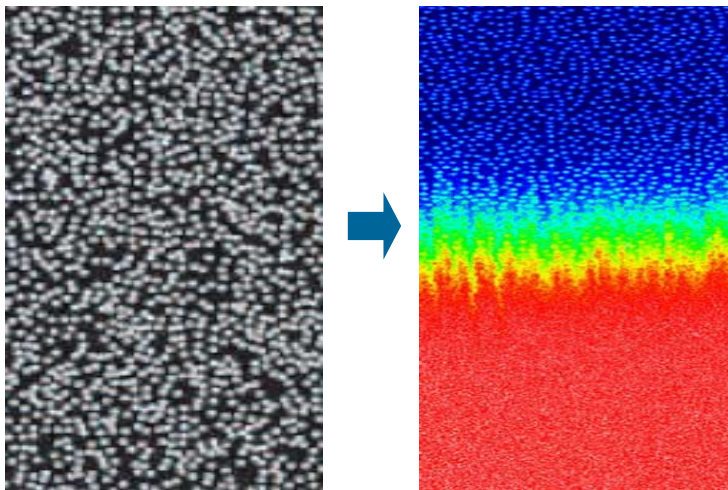


Contacto:
A. Bosch
abosch@fi.uba.ar

Transport and dispersion in fractures



Fracture with self affine walls



Fracture with random rugosity walls

We study transport and dispersion in the flow of

- Newtonian solutions
- Non-newtonian polymer solutions
- Particle suspensions

In fractures in which the walls have different types of rugosity

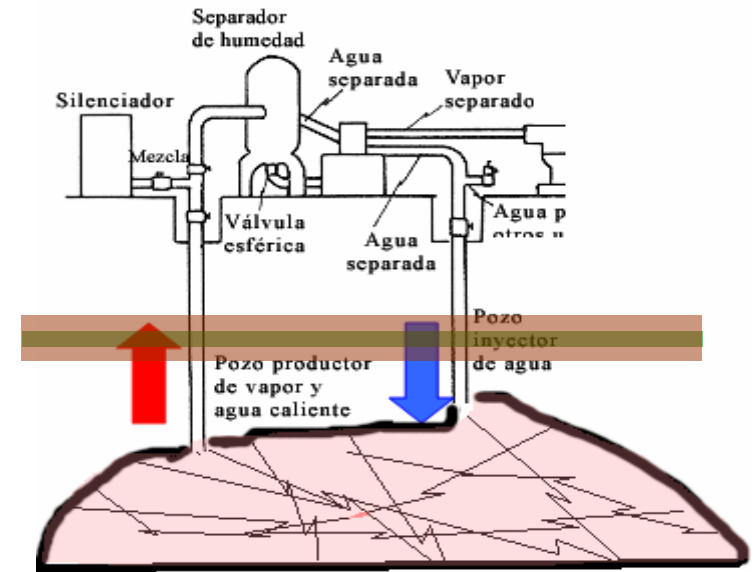
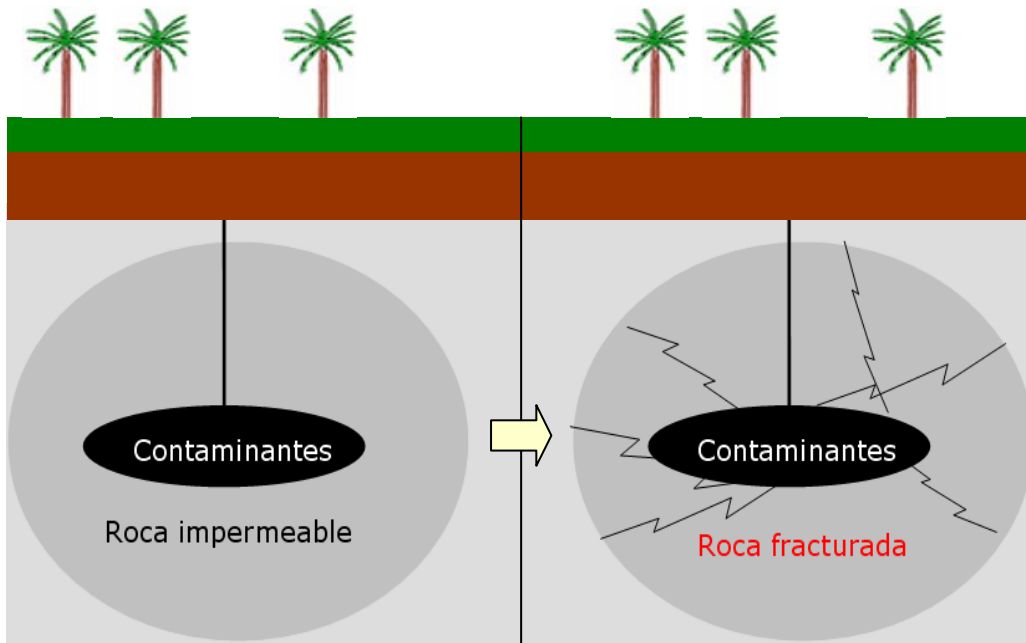
- smooth
- random
- self-affine



Contact:
abosch@fi.uba.ar

Applications

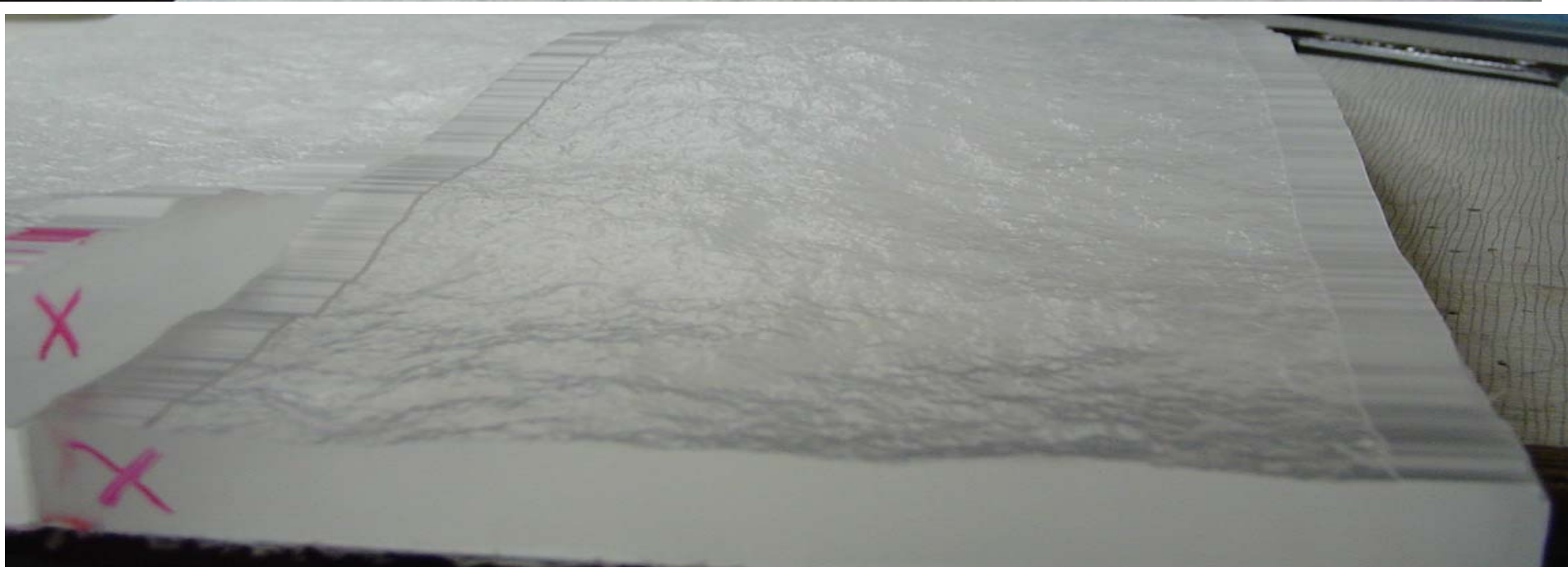
- Reservoir exploitation for water supply
- Contamination from subsurface waste repositories
- Petroleum reservoir exploitation
- Alternative energy sources: geothermal reservoir exploitation



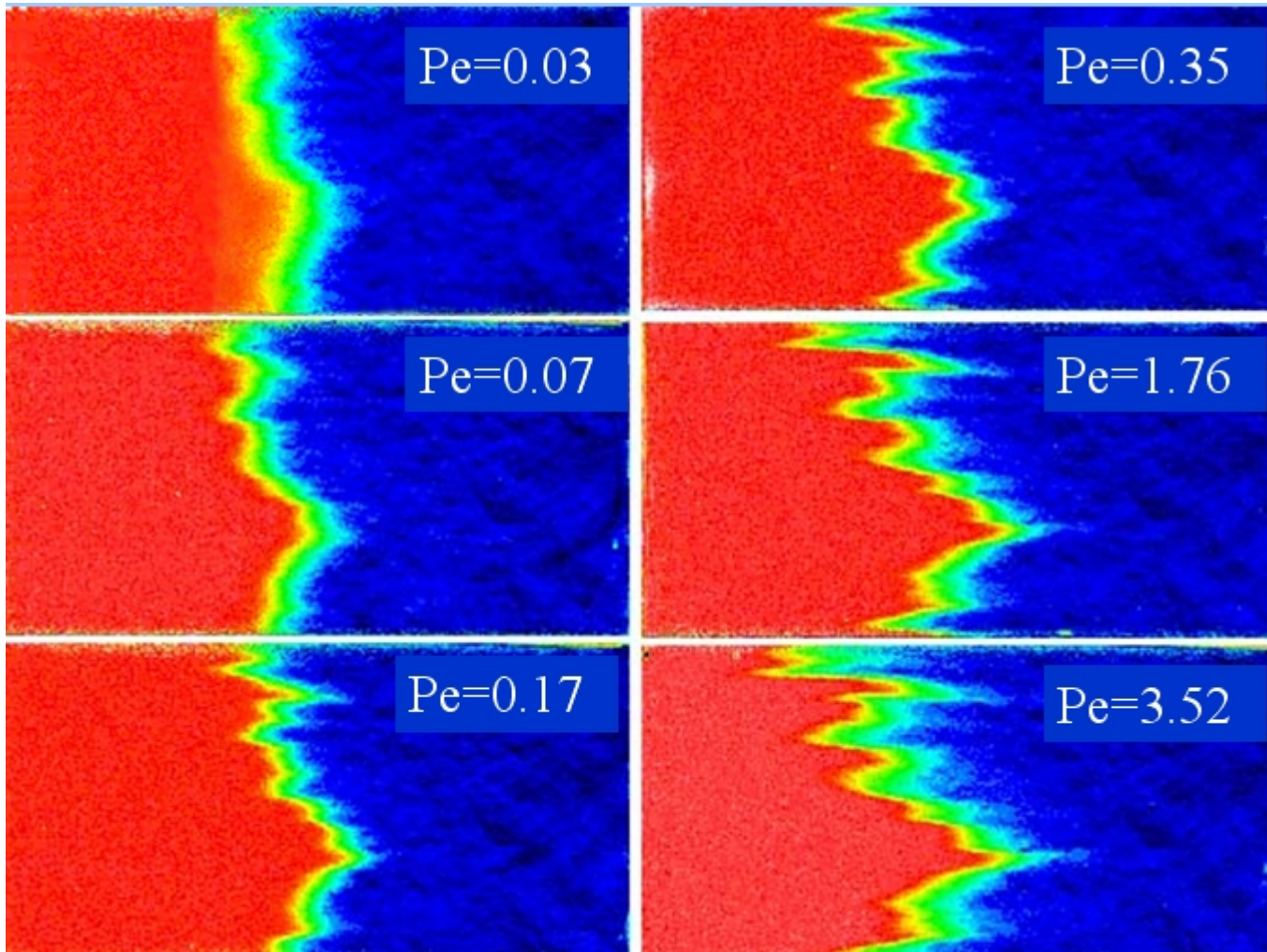
Hot fractured rock

We are interested in transport in fractures!

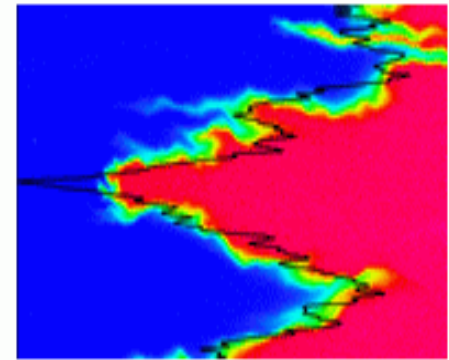
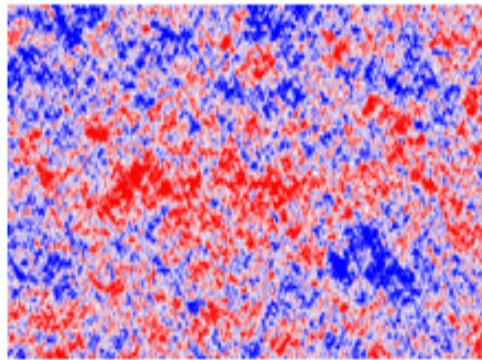
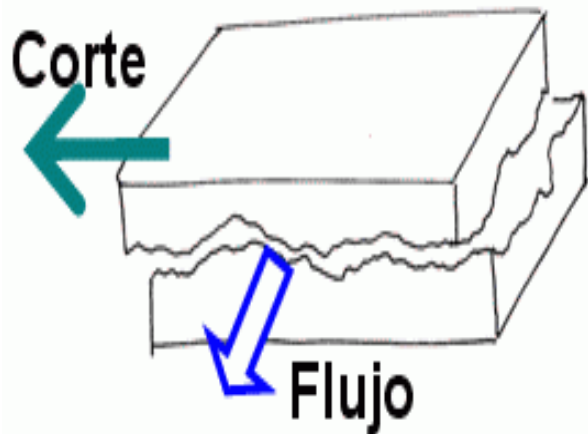
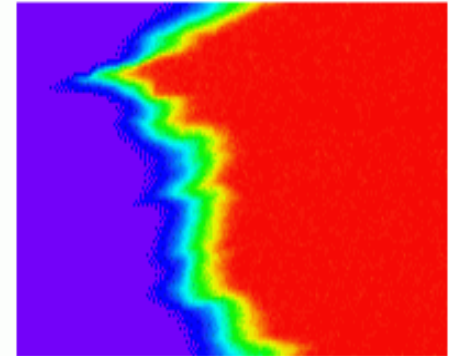
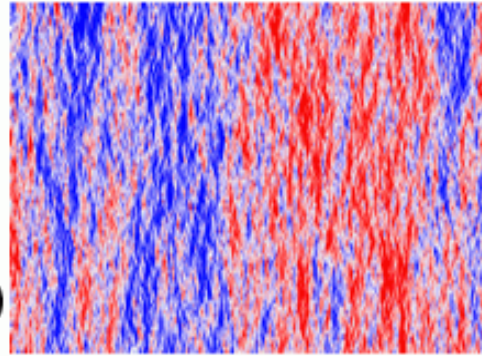
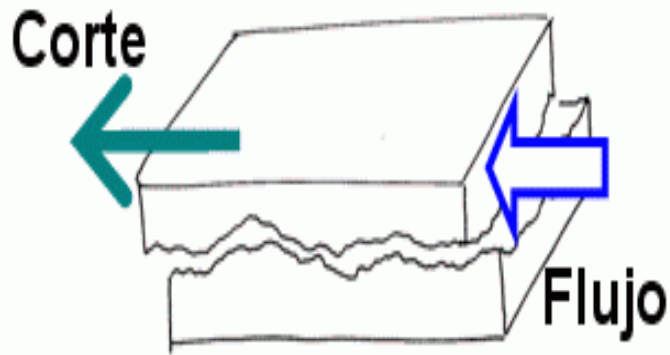
Fractura autoafín



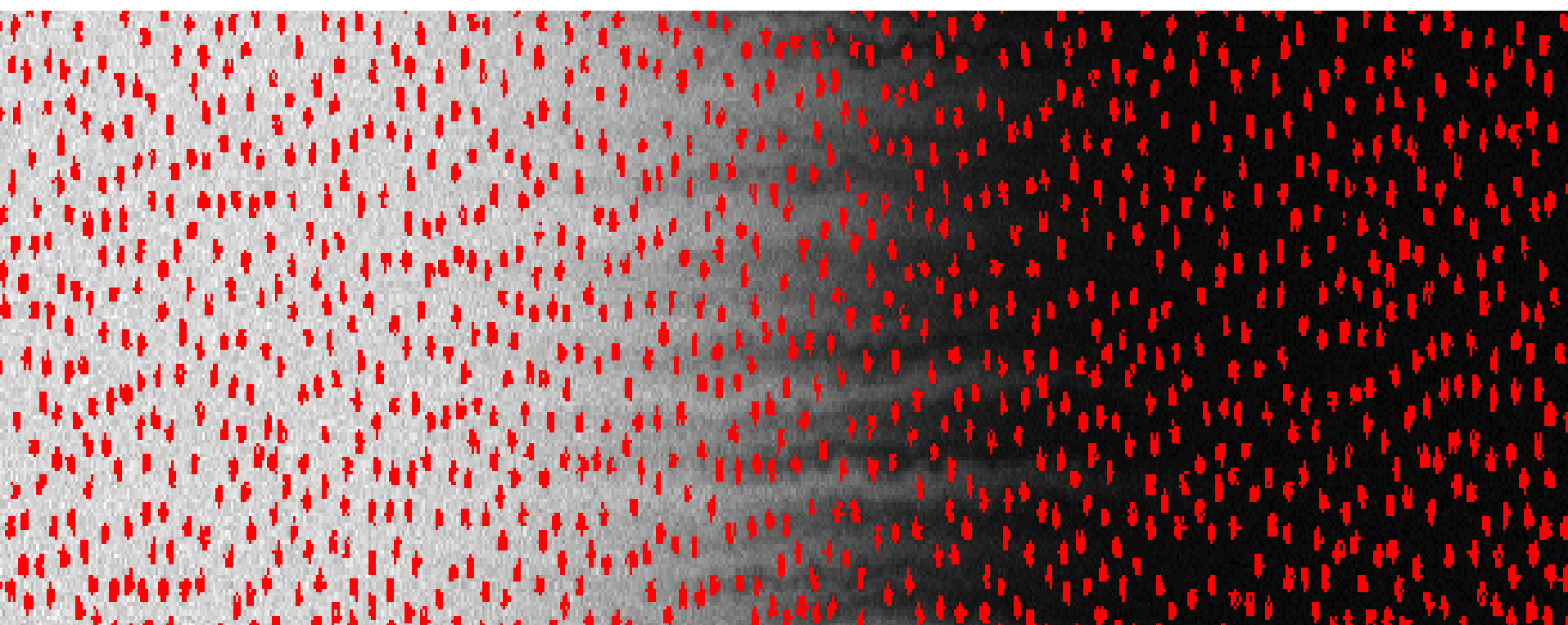
Dependencia con el caudal



Influencia de un desplazamiento de corte relativo entre superficies



Fractura rugosa aleatoria



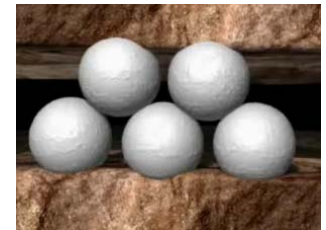
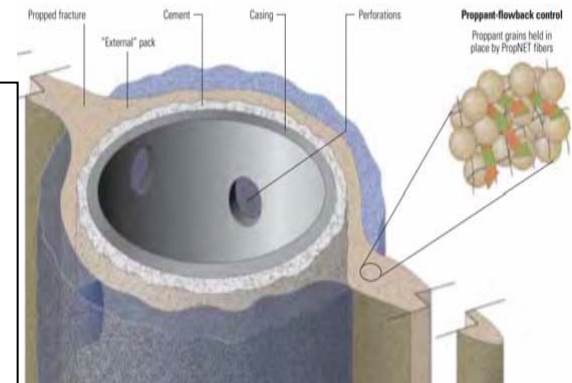
Transporte y dispersión de solutos en el flujo de suspensiones

Transporte y dispersión de solutos en el flujo de suspensiones

Motivación Suspensiones

Frecuente presencia de material particulado en:

- Flujos subterráneos y superficiales (acuíferos, canales de riego, ríos)
- Flujos industriales (**lodos de perforación**, **propantes** o **agentes de sostén**, pinturas, industria del papel, alimenticia y del cuidado de la salud)

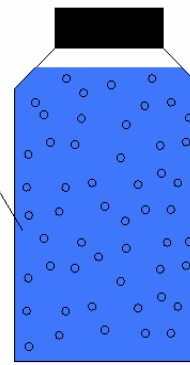


La presencia de partículas en el flujo modifica las propiedades de transporte de un contaminante (bacterias, metales pesados, radionucleidos)

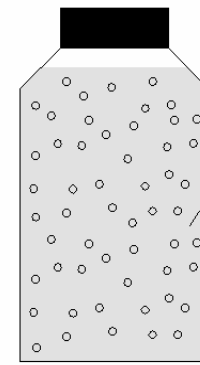
- **Enfriar, lubricar y limpiar la broca y la tubería de perforación.**
- **Transportar (flotar) los recortes a la superficie y removerlos del fluido.**
- **Mantener las fracturas abiertas por fracturamiento hidráulico**
- **Aumentar la permeabilidad y la producción**

Suspensiones

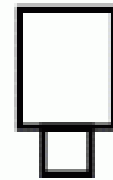
Glicerol al 21% en
agua
+
Waterblue
+
Bolitas poliestireno



Glicerol al 21% en
agua
+
ClNa
+
Bolitas poliestireno

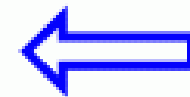


$a=20 \mu\text{m}$, $\rho_p=\rho_l=1.05 \text{ g/cm}^3$ (3 días)

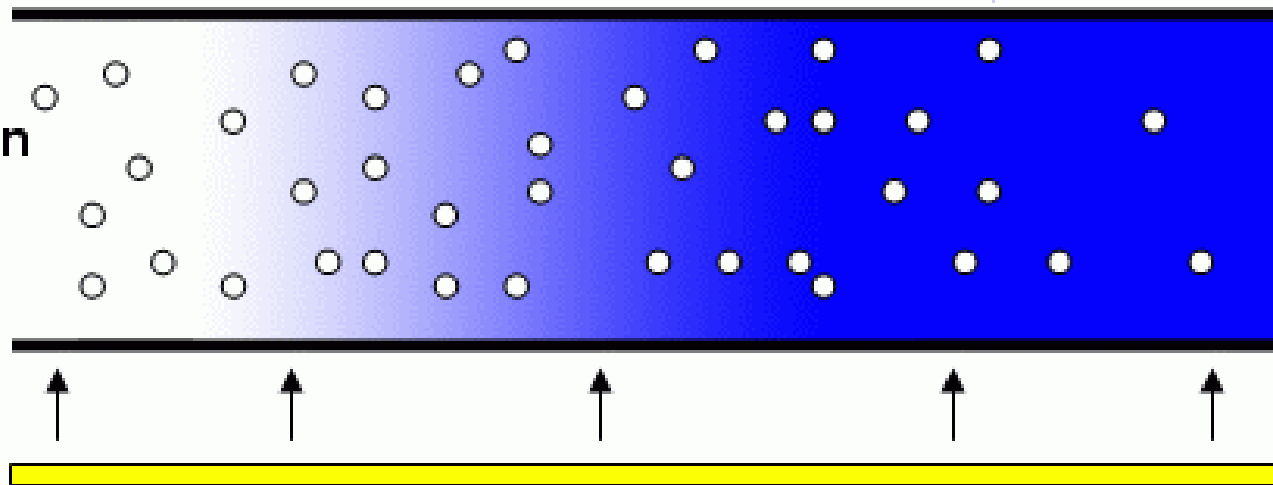


Cámara CCD

Flujo



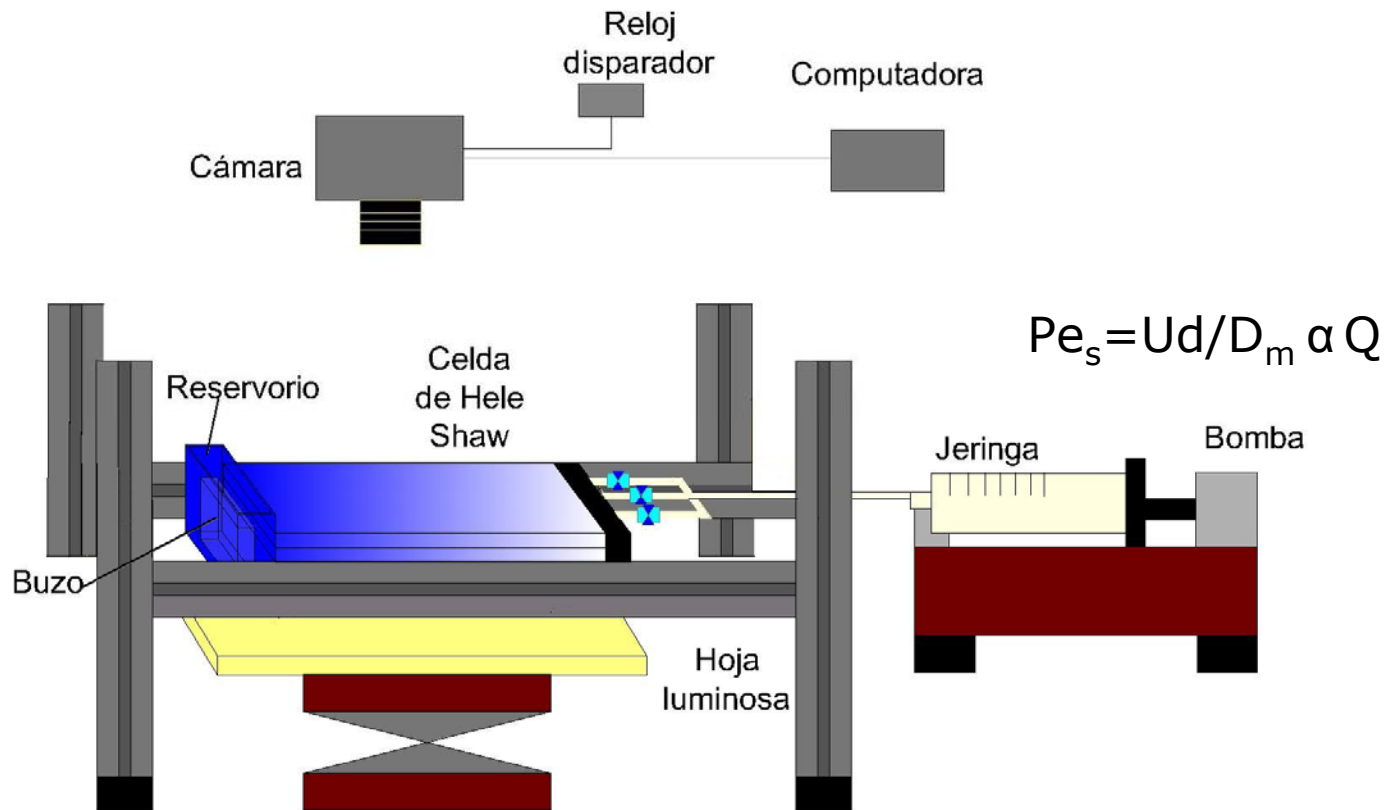
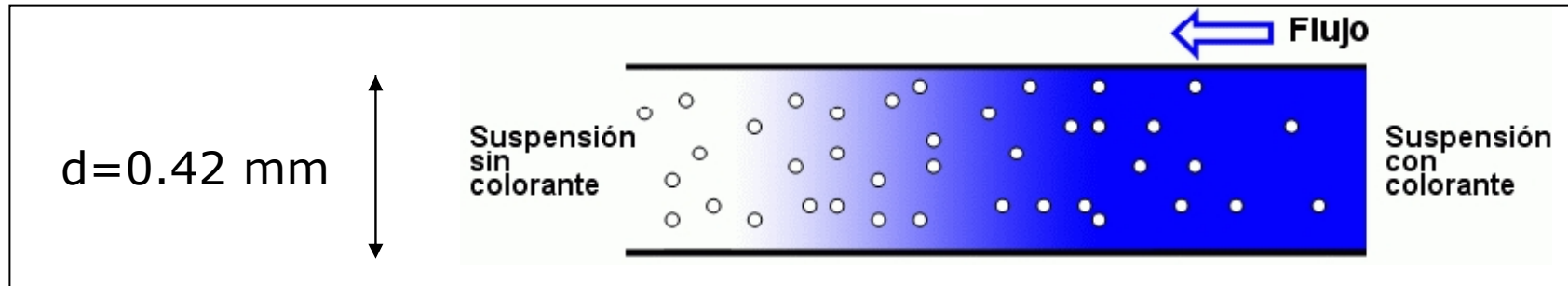
Suspensión
sin
colorante



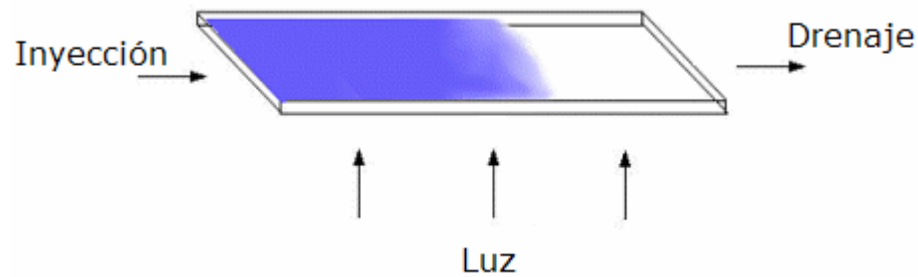
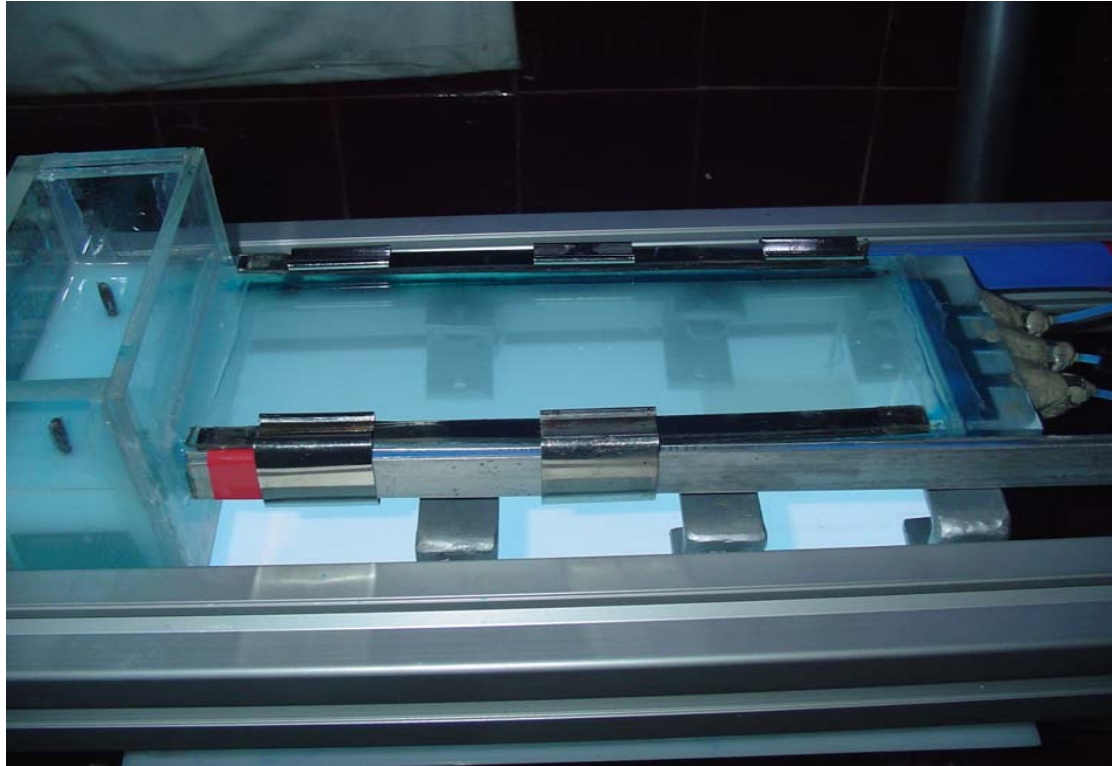
Suspensión
con
colorante

Hoja lumínica

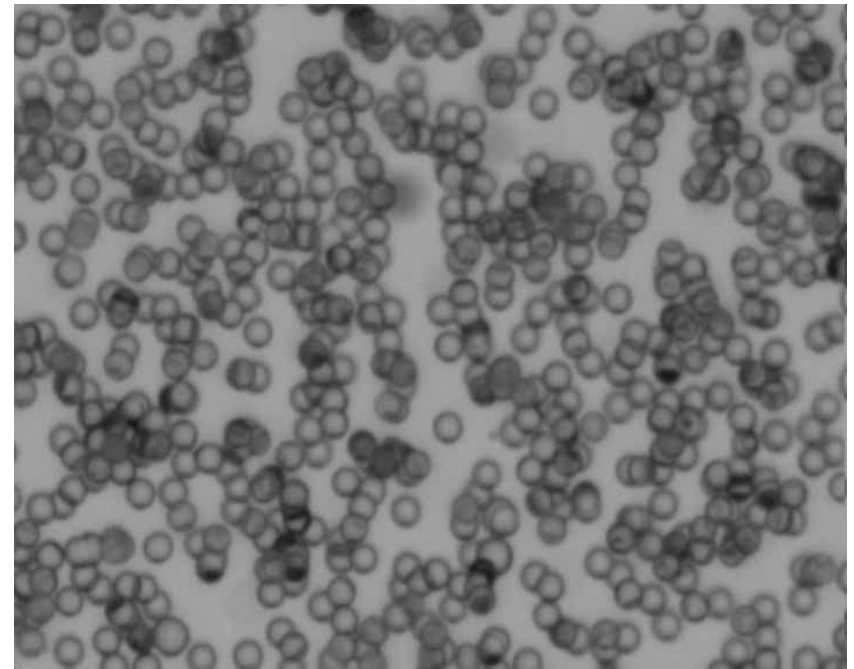
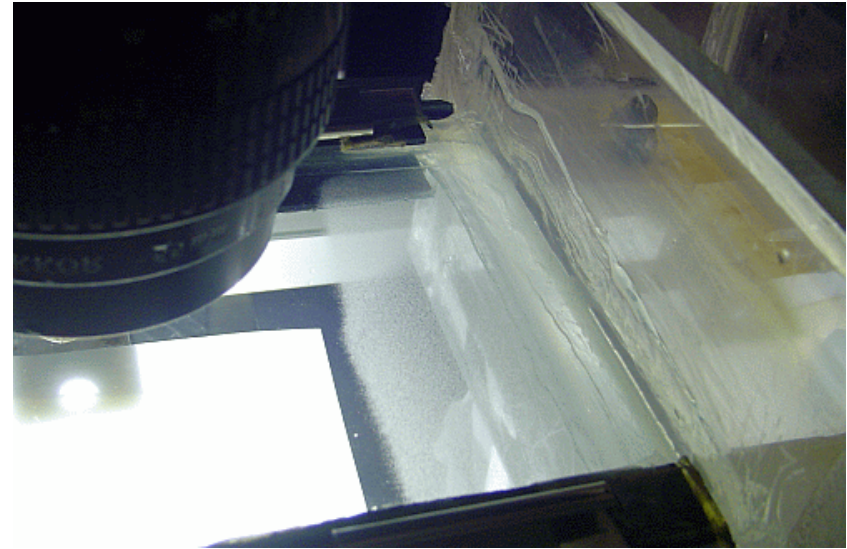
Dispositivo experimental



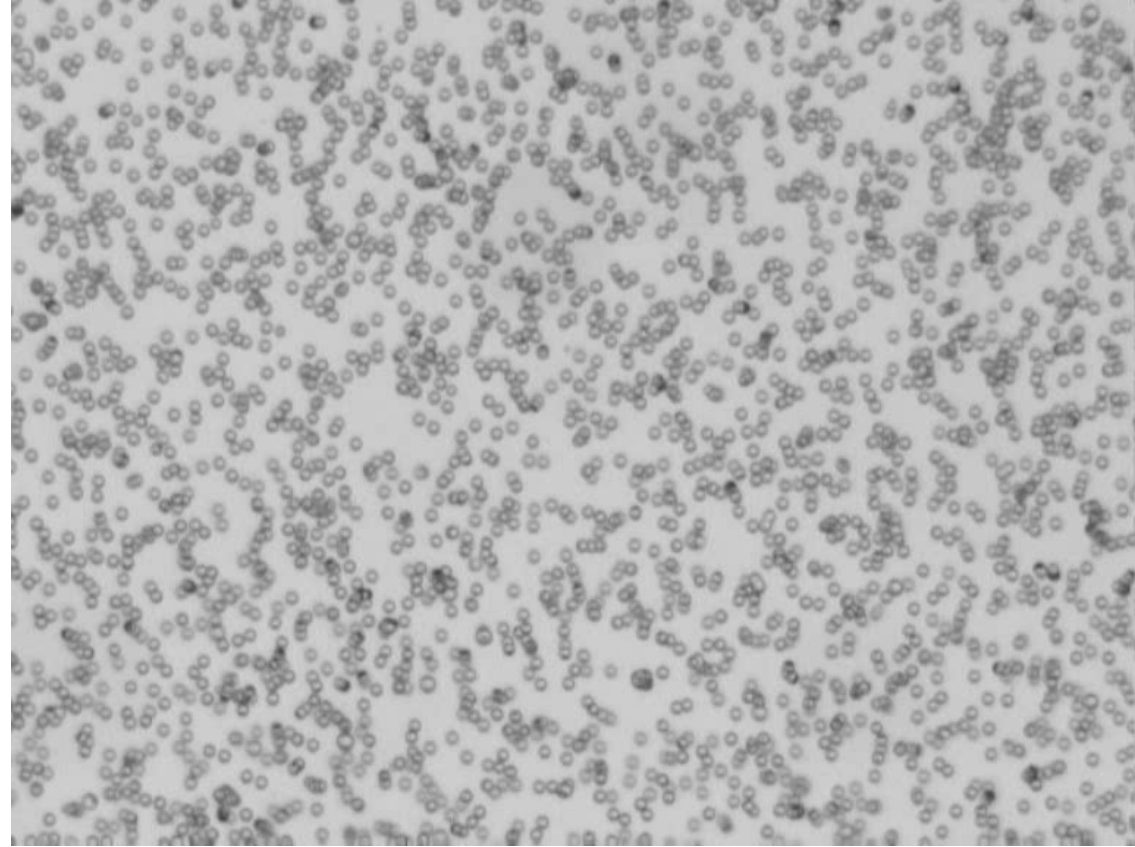
Dispositivo experimental 1



Suspension flow experiments (pressure driven, particle scale)

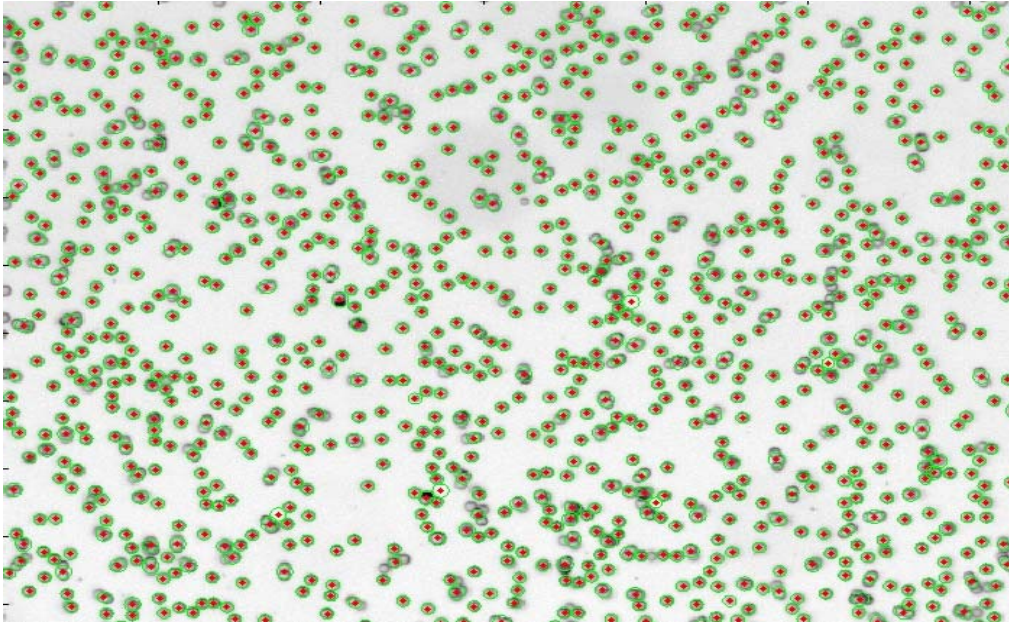


Sedimentation experiments (gravity driven, particle scale)

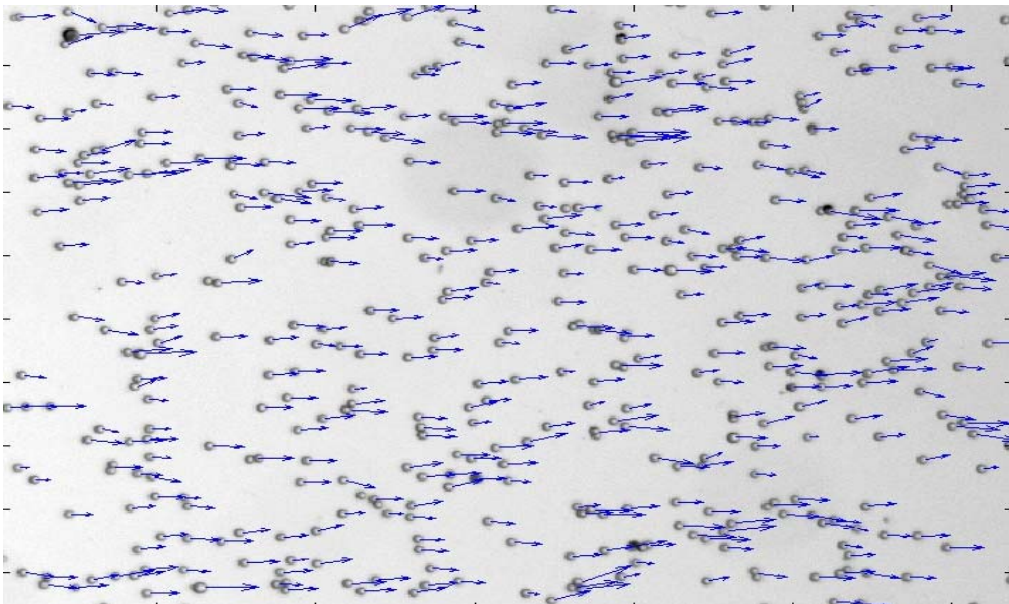


\uparrow
g

Particle Tracking: Velocity field statistics

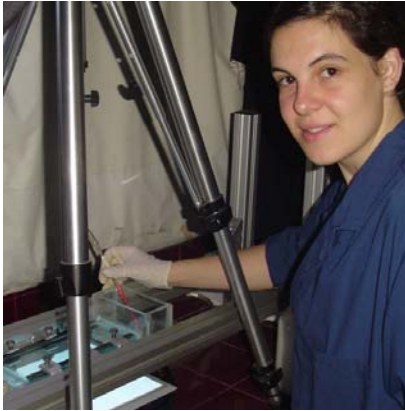


Obtaining particle positions
at each time

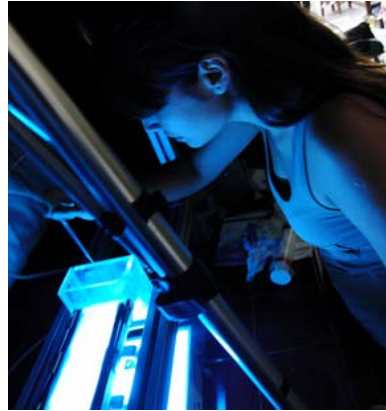


Obtaining particle velocities

Gracias!



Lucrecia Roht
Tesis de ingeniería química
(Actualmente en Doctorado)



Mariana Poblete
Tesis de ingeniería química
(finalizado)



Nico Torres Cabrera
Tesis de ingeniería mecánica
(Actualmente en Total)



Brenda Lucía Ocampo
Tesis de Ingeniería
química
(En curso)

Contacto: Alejandro Boschan
abosch@fi.uba.ar