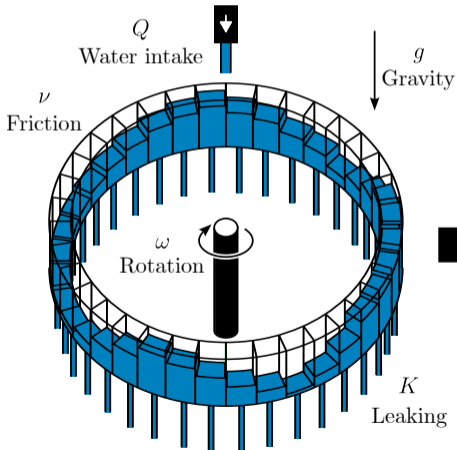# Chaotic Waterwheel

Grégoire Le Lay

Two dimensionless parameters

Rayleigh number

$$\rho \propto \frac{Q\,g}{K^2\,\nu}$$

Prandtl number

$$\sigma \propto \frac{\nu}{K}$$

3-dimensional dynamical system

$$\frac{1}{\sigma}\dot{\omega} = x - \omega$$

$$\dot{x} = -x + \omega y$$

$$\dot{y} = -y - \omega x + \rho$$

Different behaviours:
- Constant rotation,
- Periodic oscillations,
- Deterministic chaos...