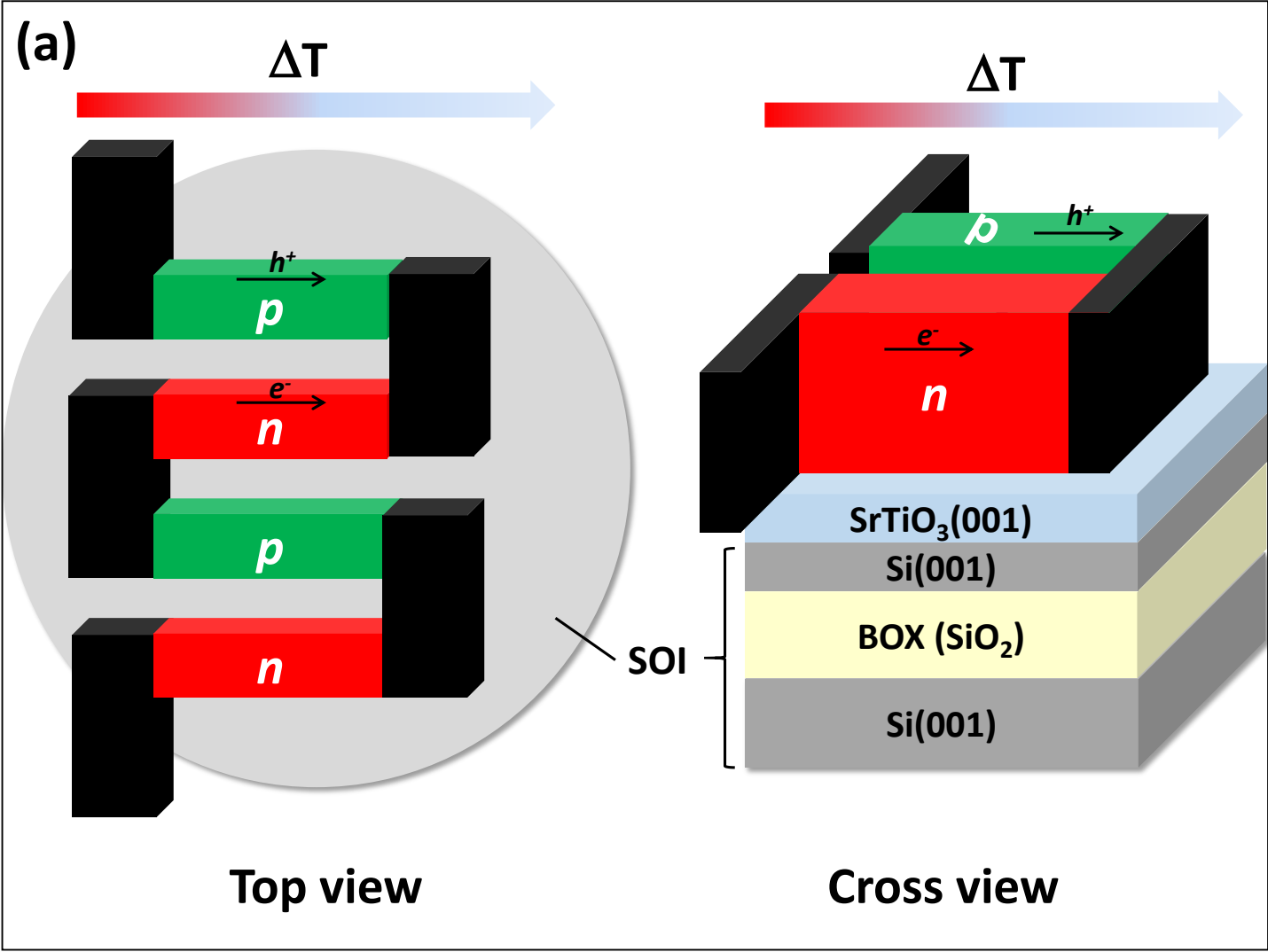


Round table

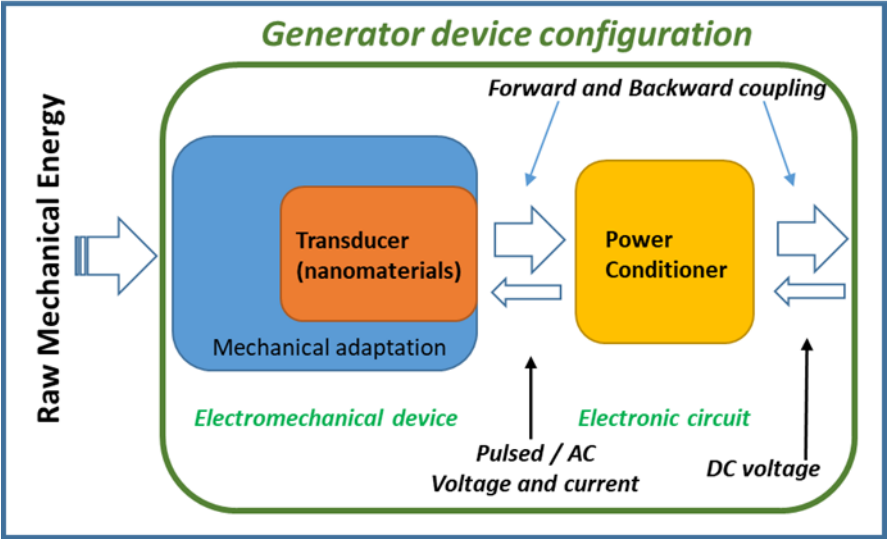
keys to imagine a device from the fabrication step

Romain Bachelet, Valentina Giordano, Olivier Joubert, Noëlle Gogneau

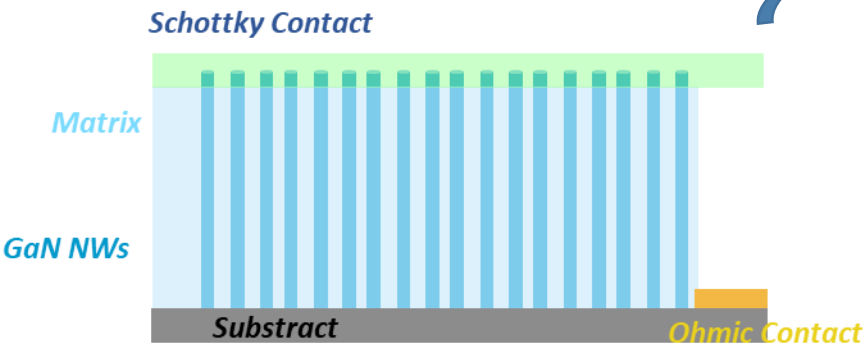
Example1: planar thermoelectric module



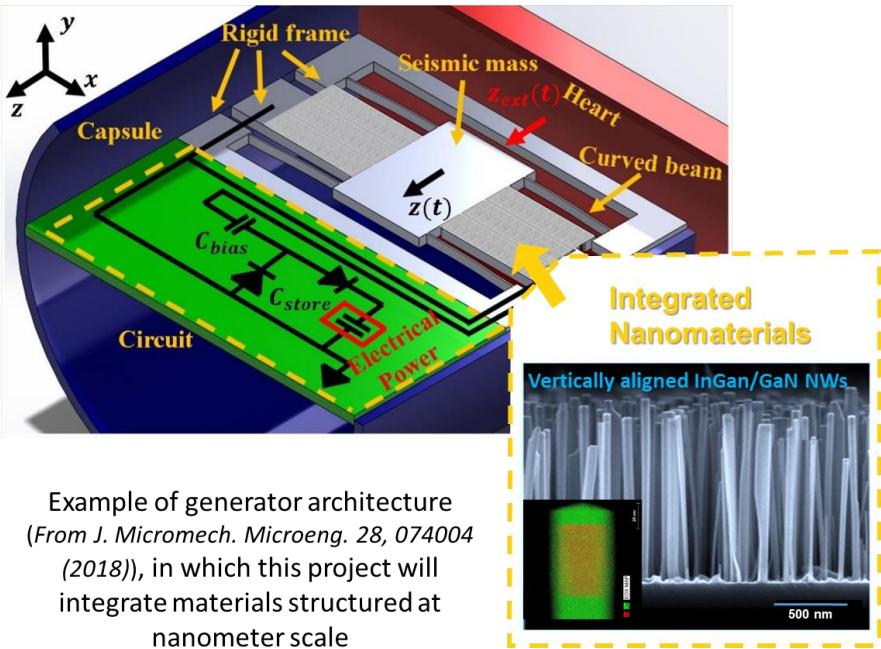
Example2: Piezoelectric transducer & PGs for mechanical/Vibration energy harvesting



1D-nanomaterials based Piezo-Transducer
= Active layer

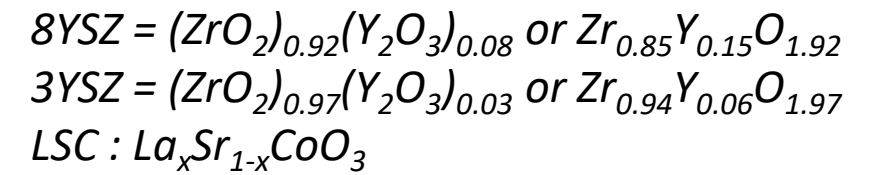
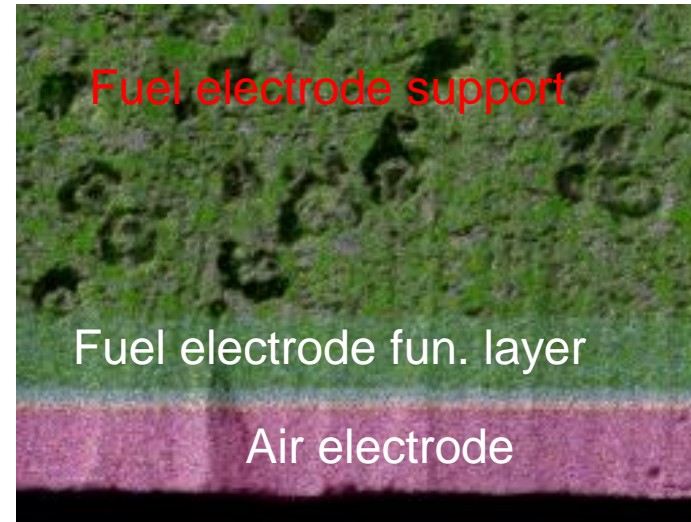
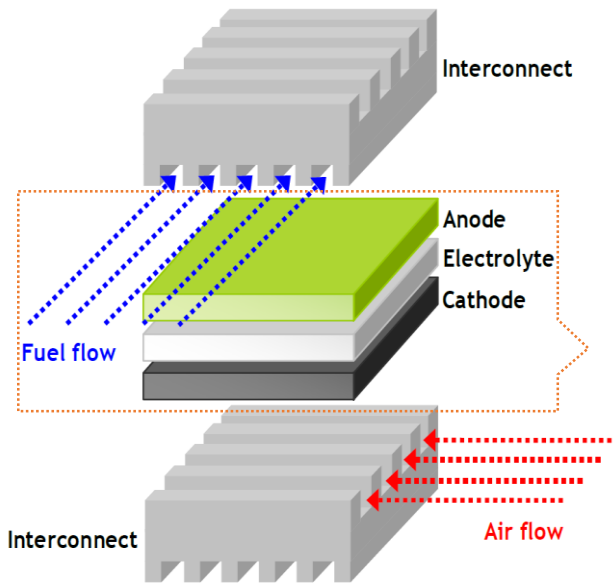


MEMS integration



Example of generator architecture
(From J. Micromech. Microeng. 28, 074004
(2018)), in which this project will
integrate materials structured at
nanometer scale

Example 3 : Solid Oxide Fuel Cell



3YSZ-NiO (396 μm), porous

8YSZ-NiO (13 μm), dense

8YSZ (2 μm) Electrolyte, dense

GDC (1.8 μm) Interface, dense

LSC (16 μm), porous

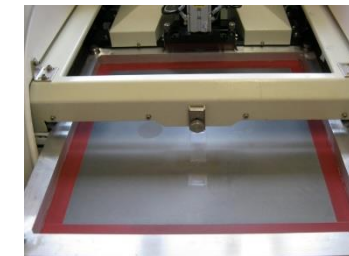
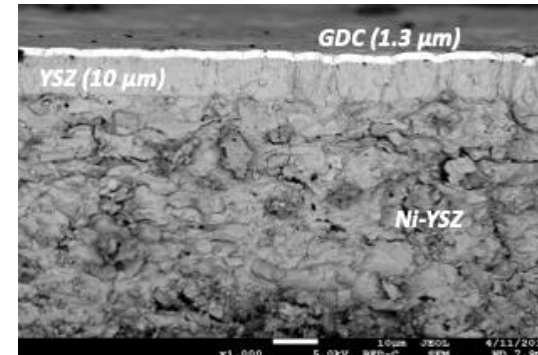


Tape casting (fuel electrode and AFL and electrolyte)



Thermal treatment (sintering)

PVD for barrier layer deposition (between electrolyte and air electrode)



Screen printing for air electrode deposition

Thermal treatment (sintering)



Thinking...

Which device ?

(** energy harvesters,...)

Which application conditions?

(Energy needs, Environment conditions, dimension constraints...)

Which “limitations” ?

(geometry, size, substrate, heterostructures,...)

Which physical properties ?

(polarization, doping, PCM,...)

Which functional materials ?

(piezoelec, pyroelec, thermoelec, SCs,...)

Which structural properties ?

(epitaxial, polycrystalline, strained, 2D/1D,...)

Which kind of materials ?

(oxides, III-V, nitrides, 2D,...)

Which elaboration techniques ?

(sputtering, PLD, MBE, CVD, CSD, electrosynthesis,...)



Realization...