

# CSSER – Center for Solid State Electronics Research



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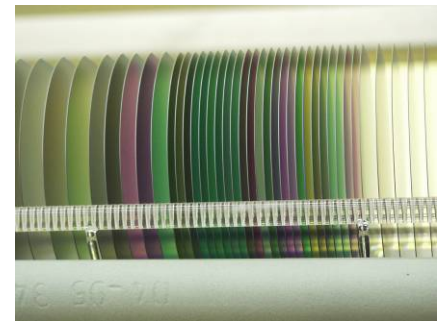
CSSER has a mission to “*Conduct research, develop technology, and provide educational opportunities which will engender international leadership in solid state electronics.*”

We manage a multi-user flexible foundry (the NanoFab) with 30,000 sq. ft. of laboratory space including a 4000 sq. ft. class 100 cleanroom.

CSSER supports the research projects of > 40 ASU faculty, > 100 graduate students and 6 external users including three faculty start-ups.

Major research themes include:

- Bio and Molecular Electronics
- Nanostructures
- Molecular Beam Epitaxy & Optoelectronics
- Micro-Electro-Mechanical-Systems (MEMS)

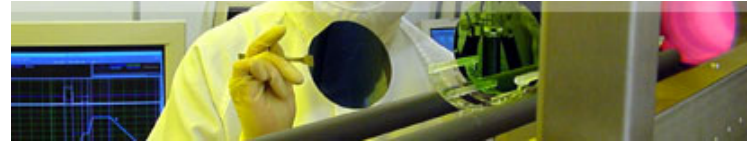


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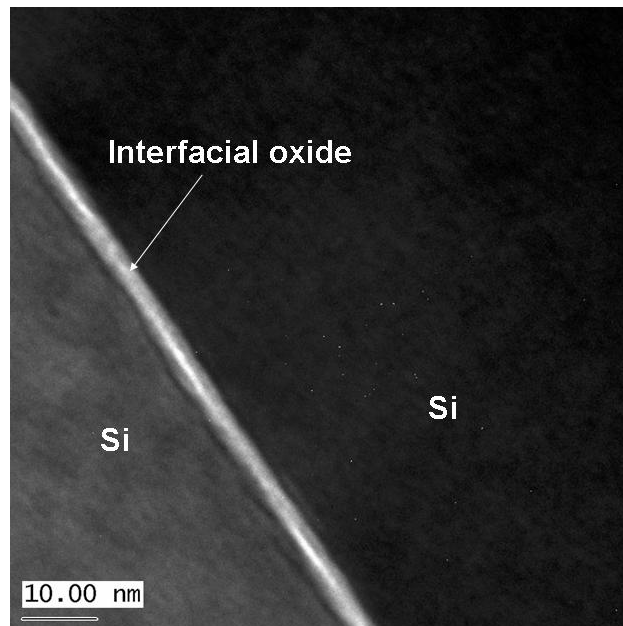
## Our capabilities include:

### 4" and 6" CMOS process that includes:

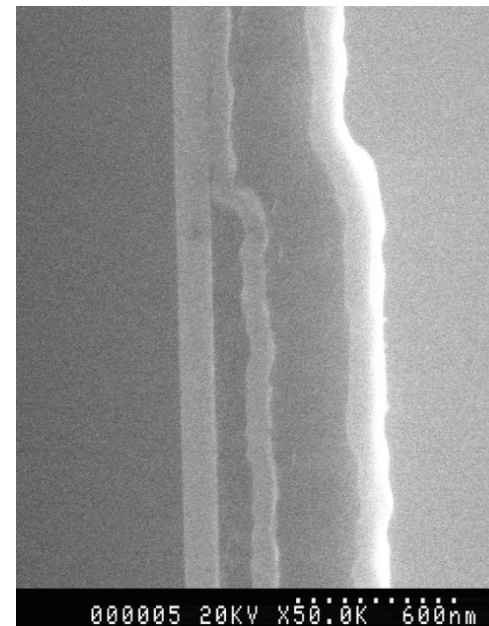
- low-stress silicon nitride
- LP-CVD of poly-Si
- wet and dry oxidation (including thick oxides up to 10  $\mu\text{m}$ )
- n- and p-type doping



e.g. thin oxides for wafer bonding



e.g. poly-Si thin-film transistors



## Our capabilities include:

- Mask making and optical lithography



- Metal deposition and general purpose reactive ion etching



- High resolution (1.5nm) field emission scanning electron microscopy



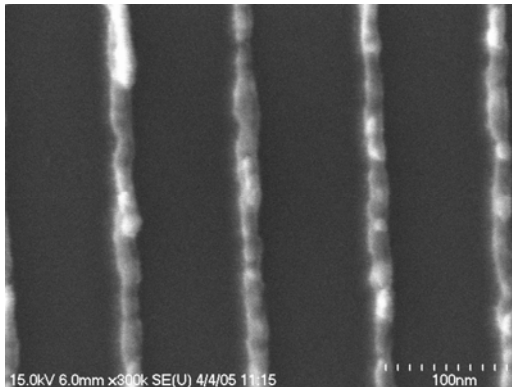
- Advanced metrology and device characterization



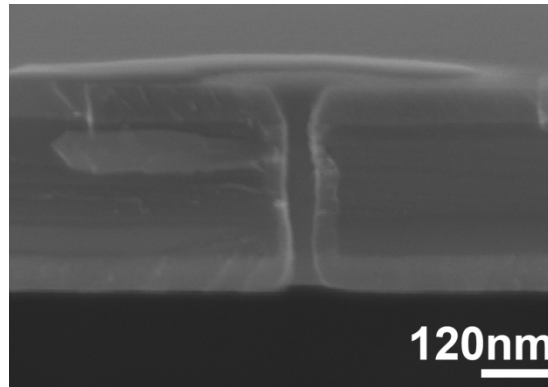
## Our capabilities include:

- advanced lithography  
< 20 nm on 8" wafers

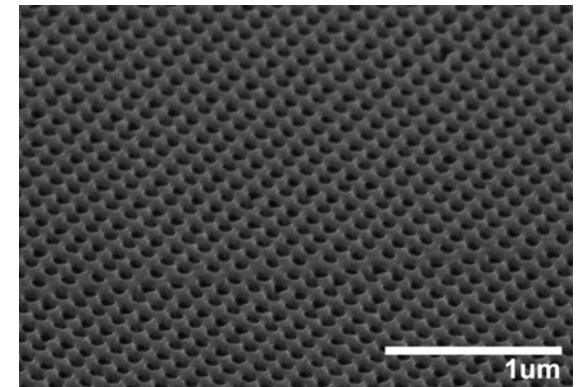
JEOL 6000SF electron beam lithography system



*12 nm lines for  
SEMATECH Corp.*



*A silicon nanopore with  
a diameter of ~ 50 nm*

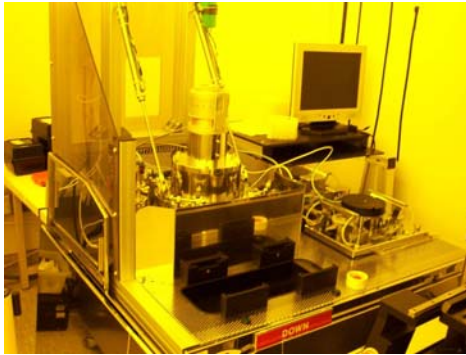


*an array of 100 million pores  
each with diameter of 100 nm*

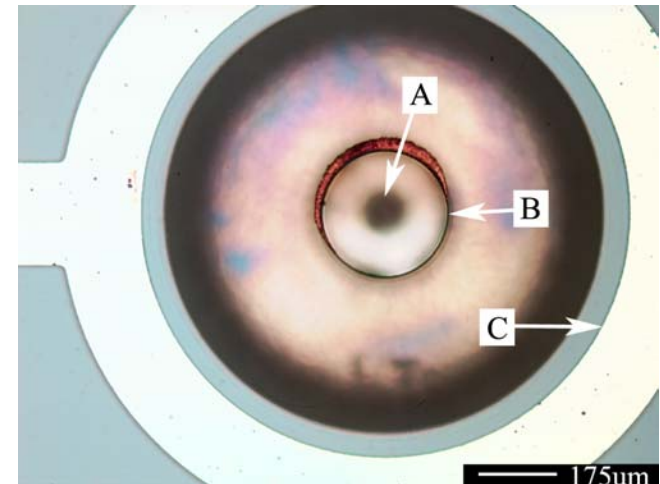
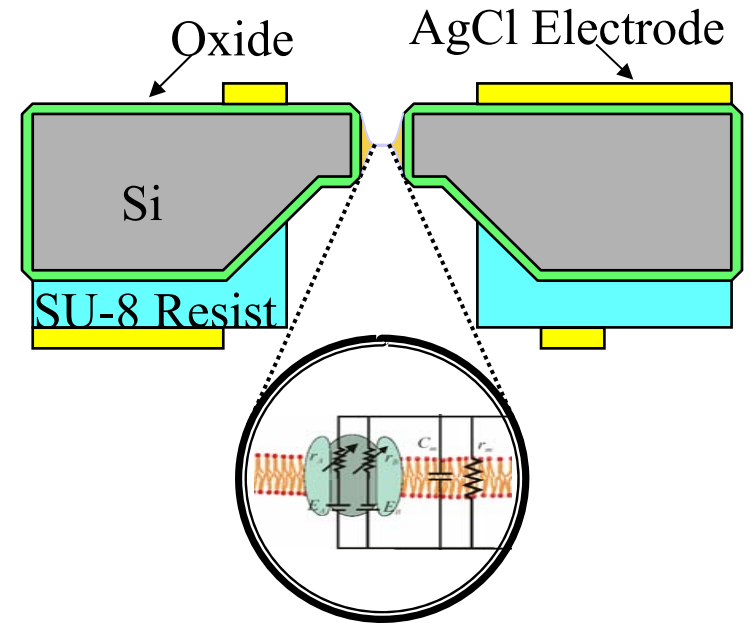


## Our capabilities include:

- deep – Si etch and wafer bonding for BioMEMS



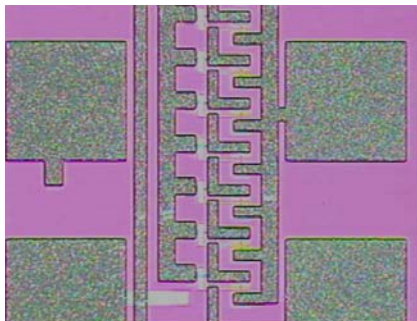
*e.g. a combination of advanced etching, wafer bonding and alignment tools allows new bioMEMS sensors based on cell proteins*



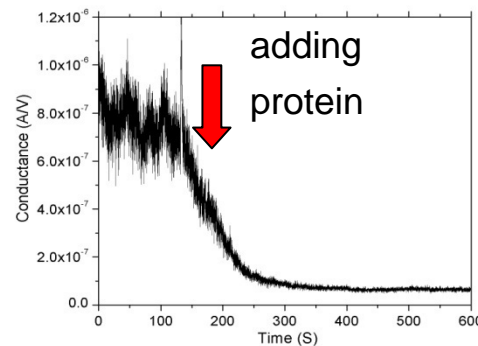
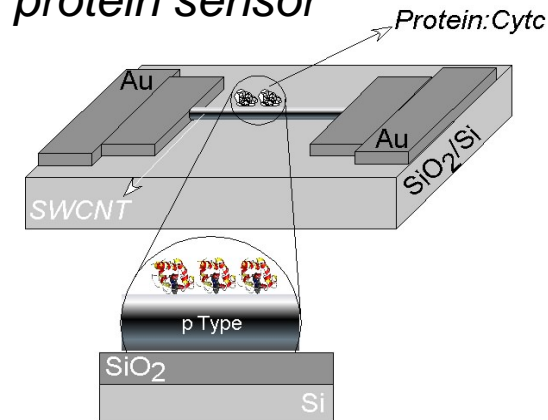
## Our capabilities include:

- general purpose micro- and nano-fabrication for research and education

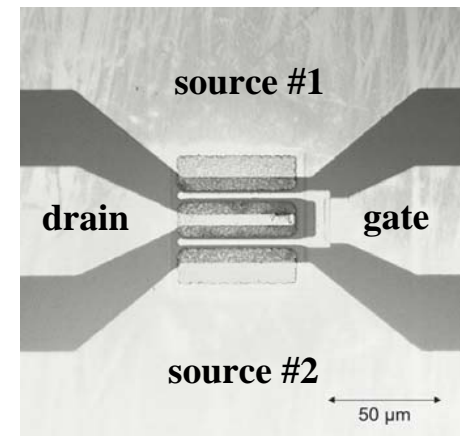
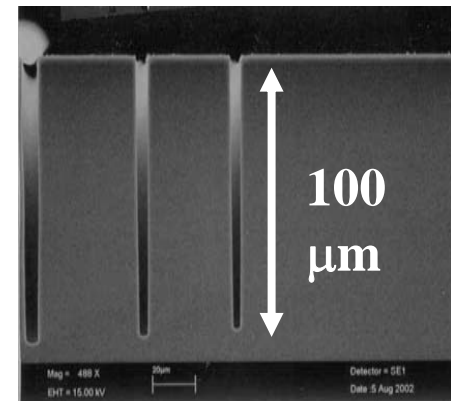
*e.g. 2  $\mu\text{m}$  ring oscillator for EEE435 CMOS Processing course*



*e.g. carbon nanotube protein sensor*



*e.g. 'Bosch' process for deep silicon etching*



*e.g. GaN RF Transistor*



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