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How do you document and share the tacit knowledge in micro and nanofabrication?

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Nanofabrication is an interdisciplinary field ranging from engineering to physics and chemistry.

It involves trial and errors…

Developing a fabrication process

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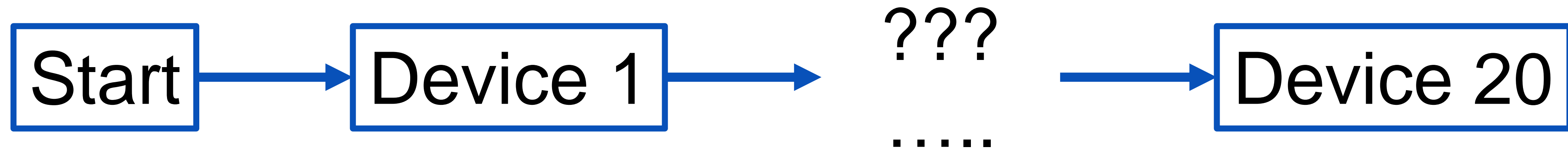
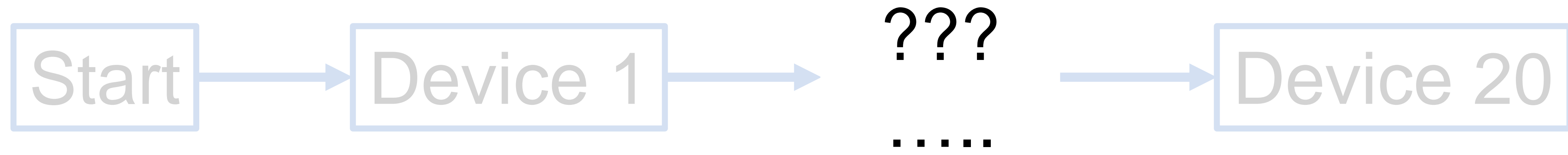


Developing a fabrication process



What happens here?

Developing a fabrication process

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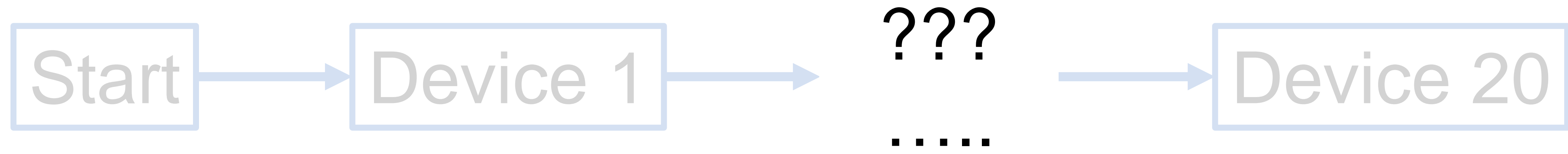
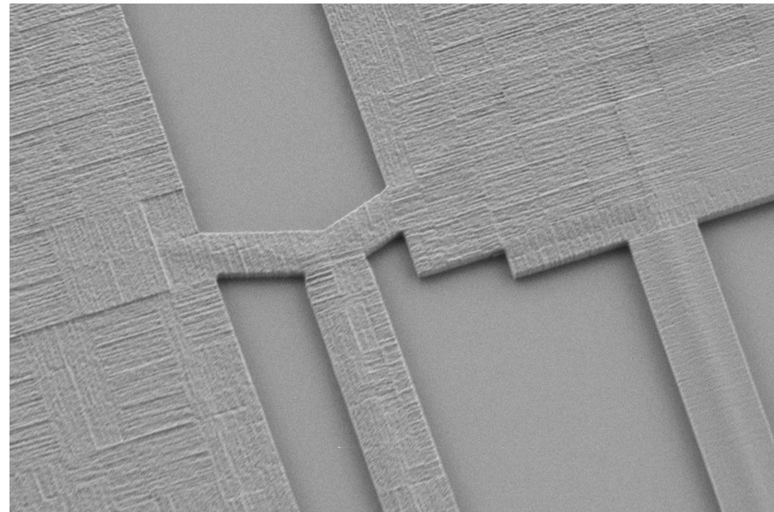
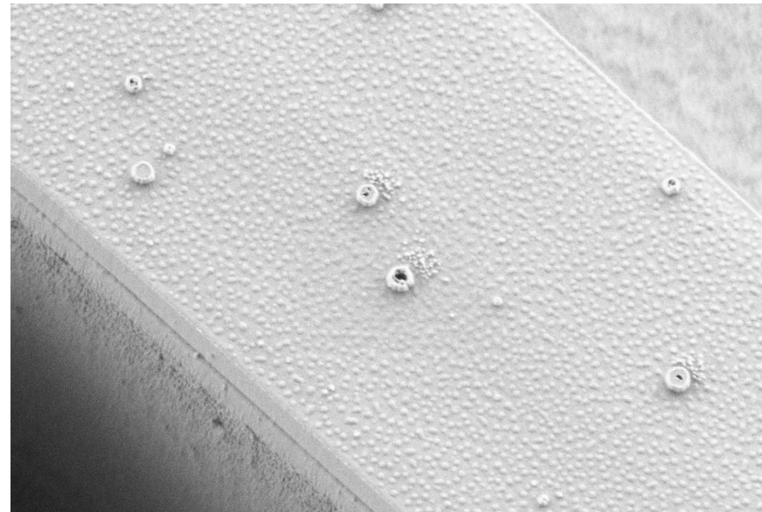
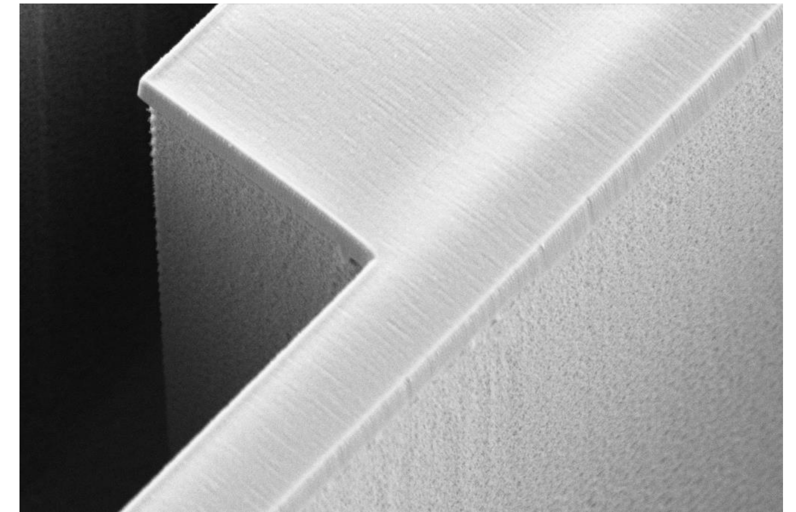


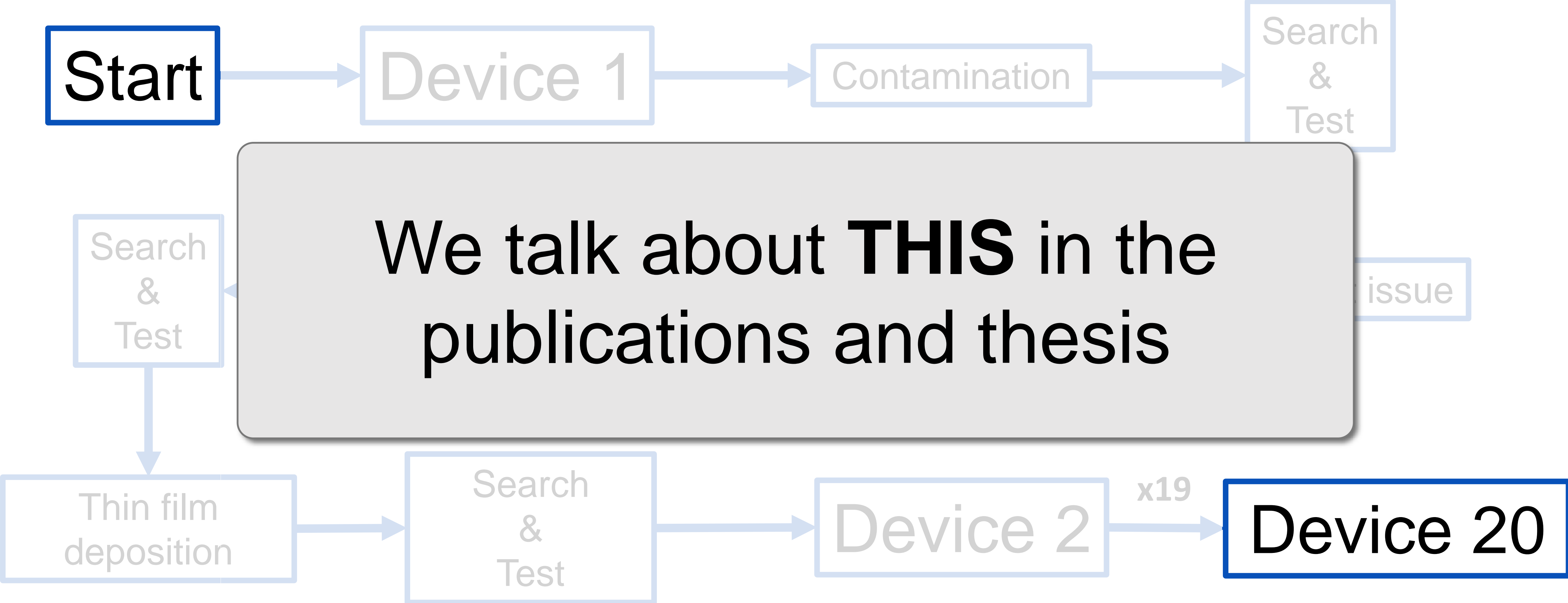




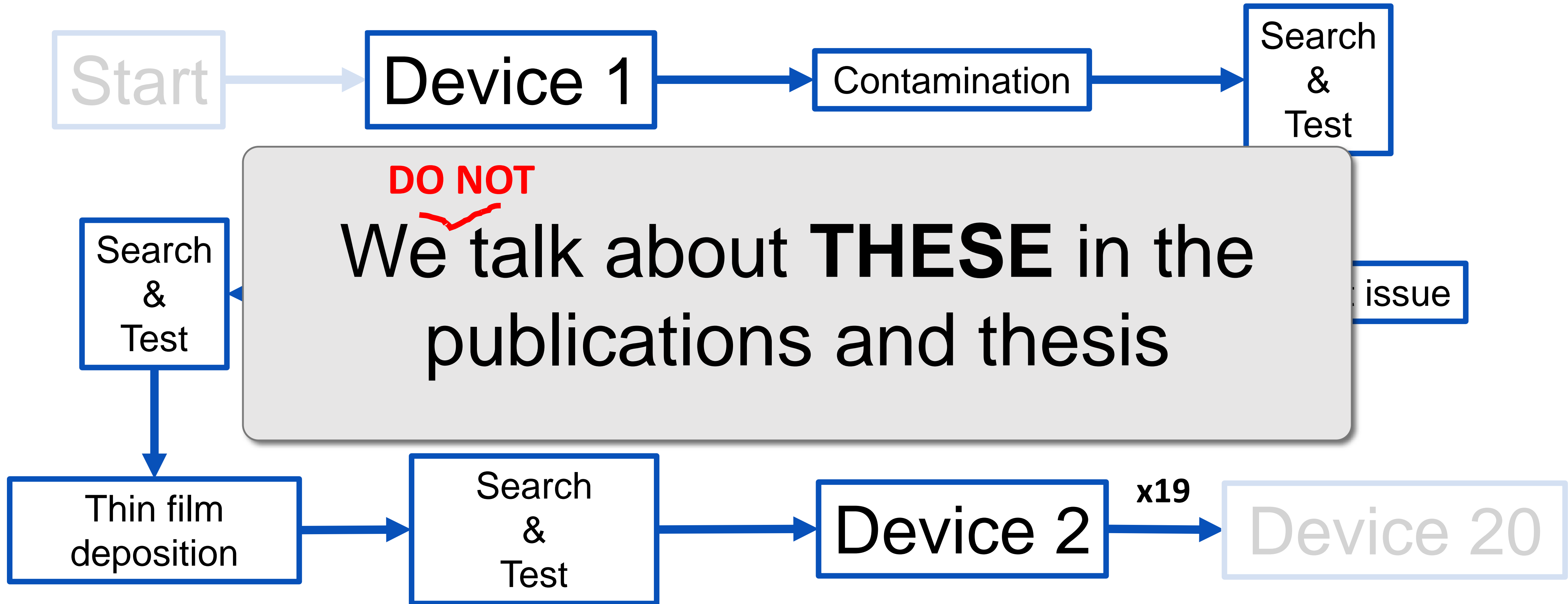


Lithography dose → Contamination → Final result

The gap: publishing the successes



The gap: lost tacit knowledge



The gap of lost tacit knowledge: current approach

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Electronic lab books: OneNote (an example)

Advantages

- **No style-guide**
- Versatile
- **Searchable**

Disadvantages

- **Limited access**
- Synchronization
- **Not possible to reference**

Resist coating:
1min O2 plasma high power for cleaning the surface followed by 5min dehydration on the 183deg hot plate. Letting the wafer rest for 1min on a tissue, followed by coating of 2ml HSQ006.
HSQ006 with 2000rpm will give us 180nm thick HSQ based on the CMi spin curve calibration.

HSQ XR1541 006

Proximity effect correction:
I made a density map GSD design for checking the PEC. It has 5 different density of lines and the sweep on the double Gaussian scattering profile is performed.

Beta	Eta
31	[1.7,1.8,1.9,2,2.1,2.2]
32	[1.7,1.8,1.9,2,2.1,2.2]
33	[1.7,1.8,1.9,2,2.1,2.2]
34	[1.7,1.8,1.9,2,2.1,2.2]
35	[1.7,1.8,1.9,2,2.1,2.2]

The dose used for this test was the usual HSQ dose, 1700 uC/cm2. The same wafer will be cleaned using BHF dip for the actual etching test mask using the calibrated PEC parameters.

The wining configuration is (beta,eta) = (33,2.1)

CMi EPFL Center of MicroNanoTechnology

Wafer bank
Photonic Crystal Cavity
PhC01
PhC02
Support buckling
PhC03
PhC04
PhCNBC
Process development
Mockup test
PhC PF Development
HYB01-02
HYB02 - 07.2019
HYB03 - 08.2019
HYB04 - 08.2019
HYB05 - 09.2019
Wafer preparation
Thinning down for mechanics
Thinning down ebeam
Thinning down etching
Device layer
Device ebeam
Device etching
Mesa
DRIE ebeam lithography
Mesa photo lithography
Mesa etch
Dicing
Protection coating and dicing
Cleaning
Cleaning after dicing
Release
KOH 40%
SF6 Si release
XeF2 release
HYB06 - 10.2019
HYB07-06 redo - 10.2019
Wafer preparation
Thinning down for mechanics
Thinning down ebeam
Thinning down etching
Device layer
Device ebeam
Device etching
Mesa
DRIE ebeam lithography
Bulk etching
Recess ebeam
Mesa photo lithography
Mesa etch
Dicing
Protection coating and dicing

What if…

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zenodo