# 7th Metallization & Interconnection Workshop 2017

## **Topic 1:** Advanced printing in production

**Statement:** '*When it comes to mass production, progress in screen printing has always outpaced and will always outpace that of competing technologies.*'

**Counter-statement:** *'Dual, double, triple : fancy, but in production, robust fine line printing does the job just as well and is way simpler.'*

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## *Screen printing has always outpaced and will always outpace that of competing technologies*

- Yes, but…
- Industry is constantly looking for improvements, wants to move forward and there are issues that need to be solved.
- So, evolutionary changes will probably be implemented into industry if they:
  1. increase throughput or efficiency
  2. reduce Ag consumption,
  3. reduce breakage
  4. or result in more homogeneous print
- Same paste should be useable for the new technology / technique
- Basically SP will evolve by itself, small changes at the time, reliability of cells/modules needs to be proven for all (incremental) changes

## Limits to current screen printing:

- 300 mm/sec
- Line width ? ~ 30 microns??
- Breakage is more due to interaction with other processing steps and handling
- Clogging ?

## Other potential technologies (order of likelyhood)

1. Dual print → evolutionary, and is happening in industry. Results in less Ag consumption, and is more stable than double print. Is easy to add, when extra printer is there already. Could be more important for HJ, since low T pastes are more difficult to solder.
2. 0° - knotless printing: could be next step, possibly followed by stencil print. Issue: screen / stencil life → CoO needs to be favorable. Paste and printer need to stay the same (no additional costs), only change in stencil/screen.
3. Rotary printing → is more evolution than revolution, but is not (yet) able to replace front side printing (alignment, line width). Has potential for rear (full area) print. Advantage: very high throughput possible.
4. Dispensing → has potential for high throughput, fine line front side print, but not yet mature. Issues: clogging? Start/stop print at wafer edges. Advantage: lower Ag consumption, high speeds possible (800 mm/s), reduce breakage.