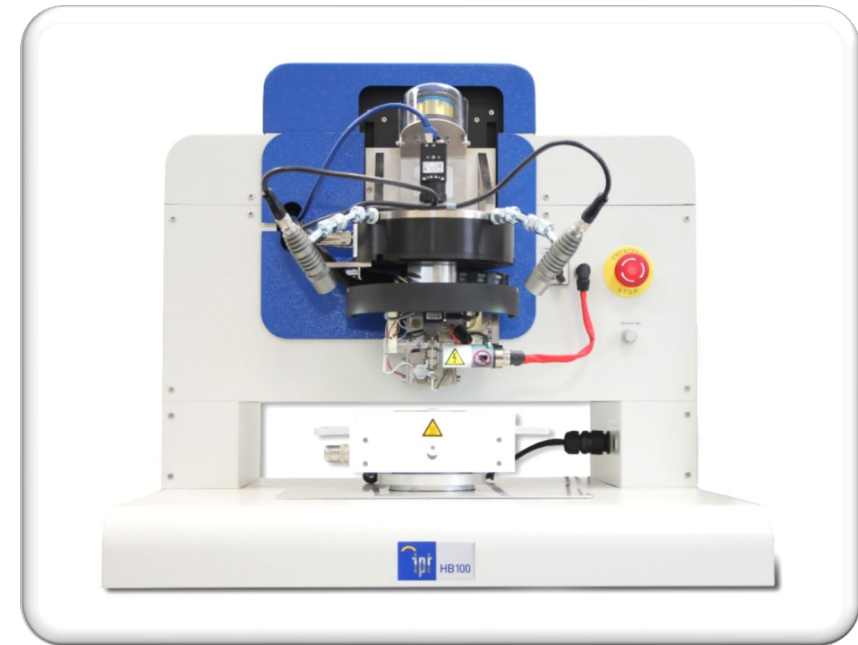
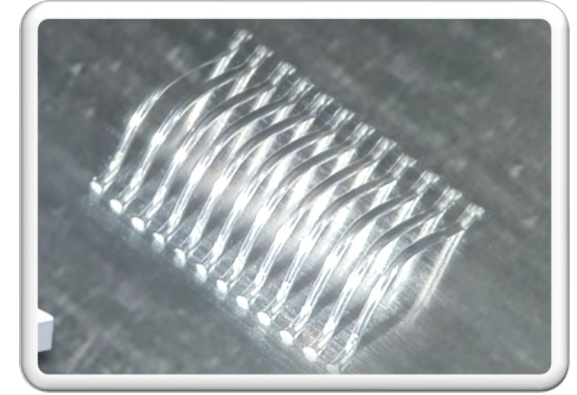
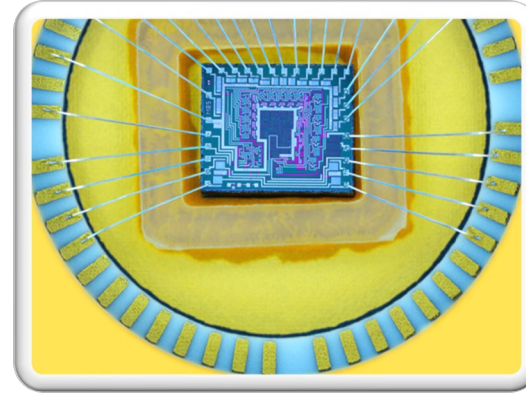


# TPT HB100 Automatic Wire Bonder

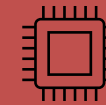




# Features



Ultrasonic Al Wedge &  
Au Ball/Wedge Bonding  
– 25  $\mu\text{m}$

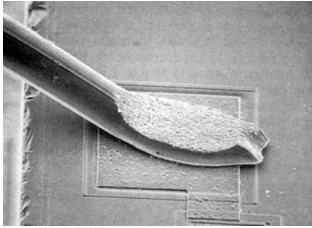


Motorized axes with  
joystick controls &  
rotatable bond head



Recipe Creation, Loop  
Programming, &  
automatic height  
adjustment

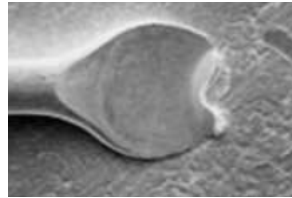
# Bonding Capabilities



[1]

## Aluminum Wedge

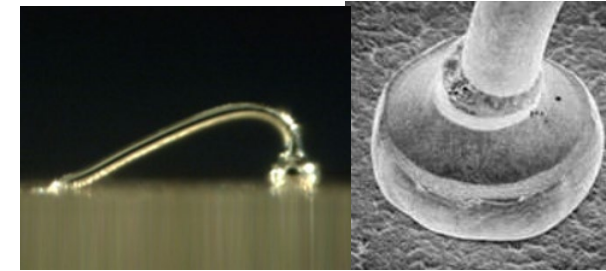
- Preferred on superconductors for low temp stability
- No heat required
- Cost-effective



[1]

## Gold wedge

- 70c recommended but not necessary
- High electric conductivity
- High thermal conductivity
- Damages bond pads slightly



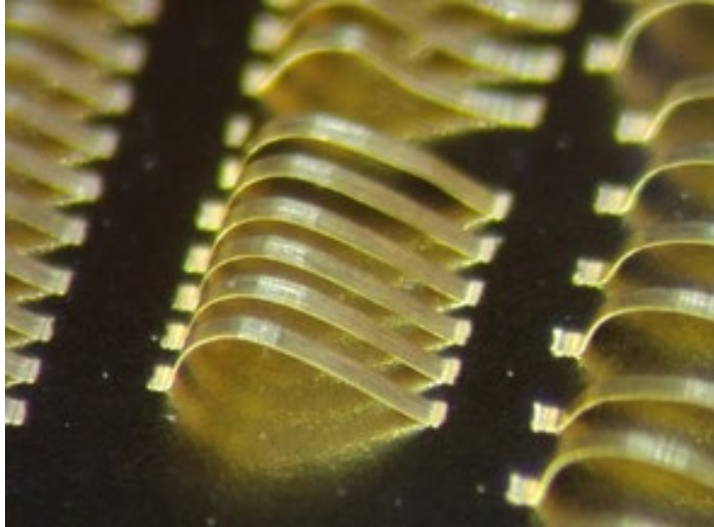
[1]

## Gold ball

- 70C heat required
- Electronic Flame Off (EFO) required
- Minimal damage to bond pad
- Generally quicker than wedge bonding
- Less vertical clearance than wedge bonding

[1] Brown. M [2020]

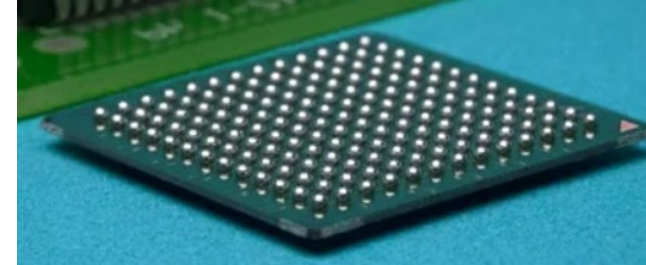
# Other bonding capabilities possible



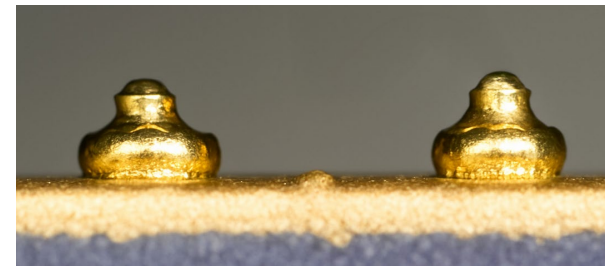
[2]

## Ribbon bonding

- Preferred for RF devices



[3]

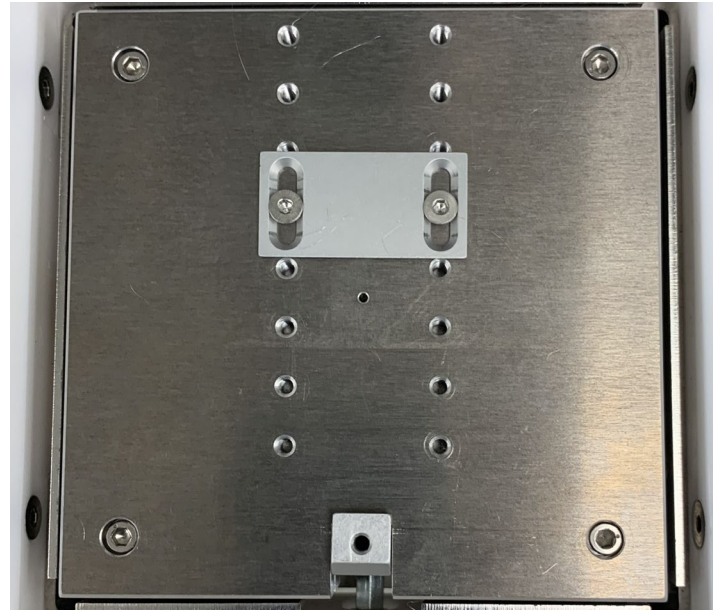
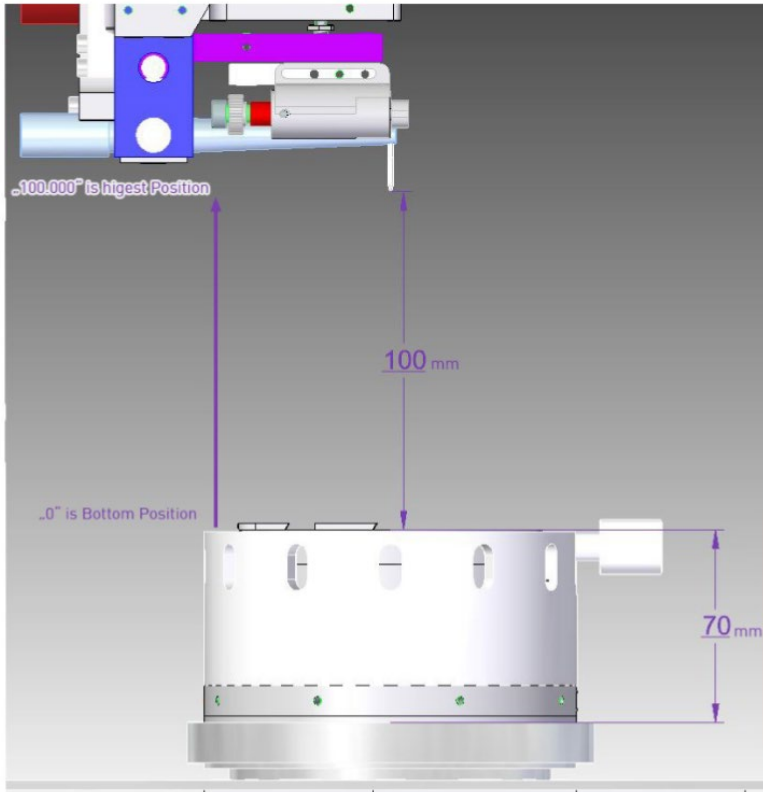


## Bump bonding

- Preferred for “flip chip” devices
- Currently possible using gold

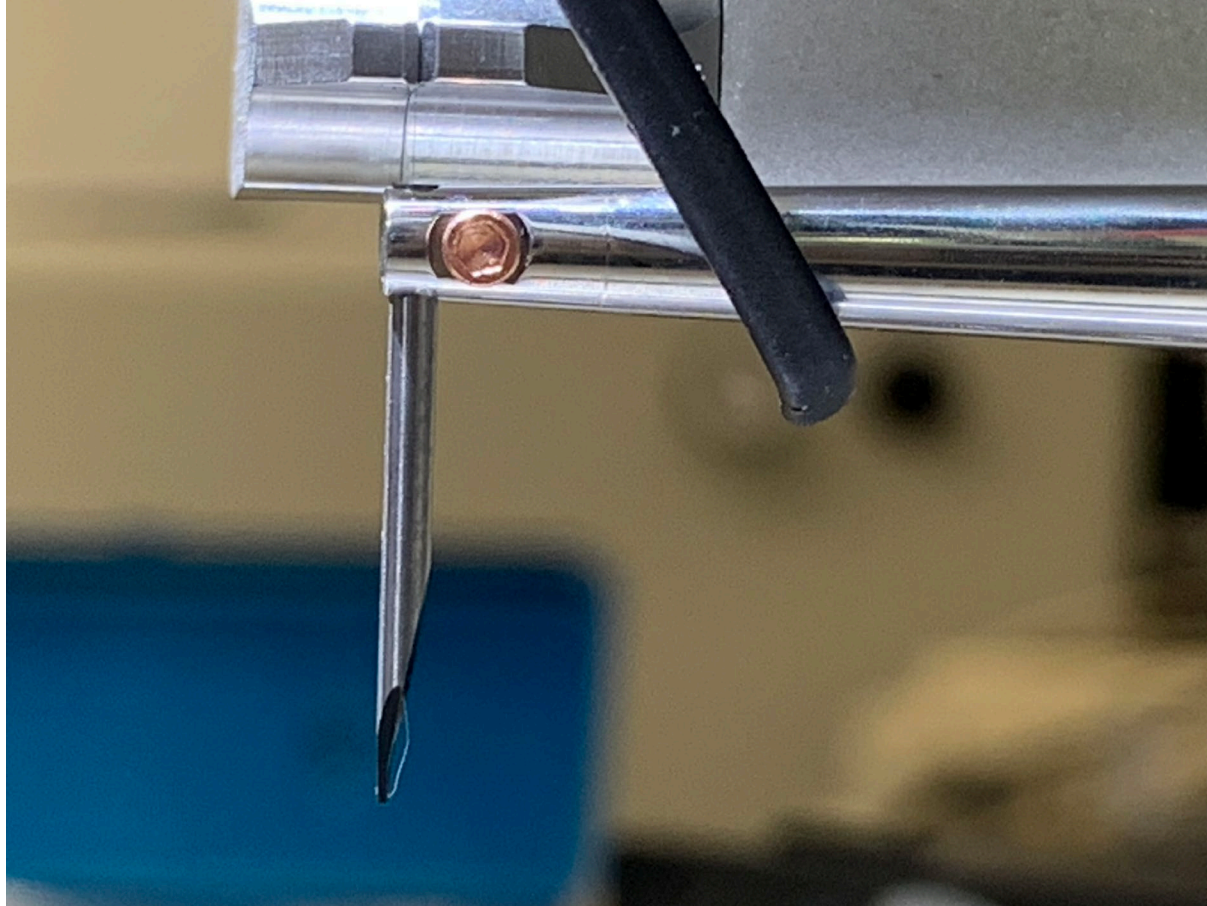
[2] Ribbon [2023]

[3] Berthelot, G [2025]



## Stage Features

- Z height – up to 100mm
- Stage – 100mm x 100mm
- Heated stage up to 100C
- Vacuum pinhole for flexible substrates

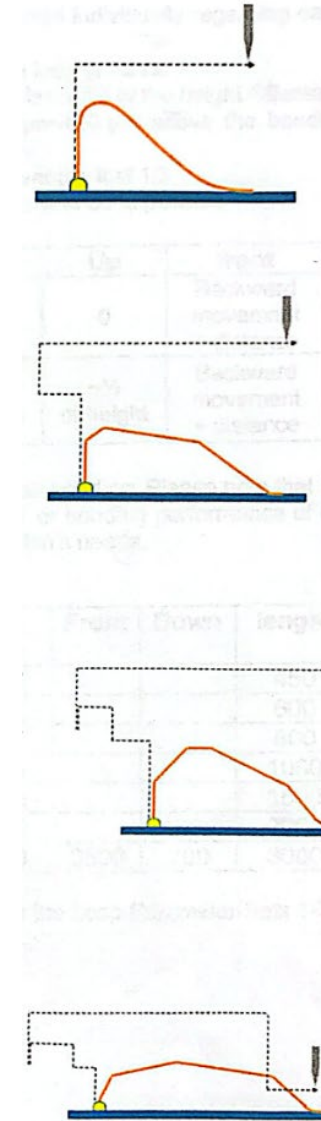


# Parameters

- Ultrasonic Frequency  
63.3kHz
- Time (contact)
- Force
- Clamp Feed vs. Table Tear
- **Loop Height & direction**

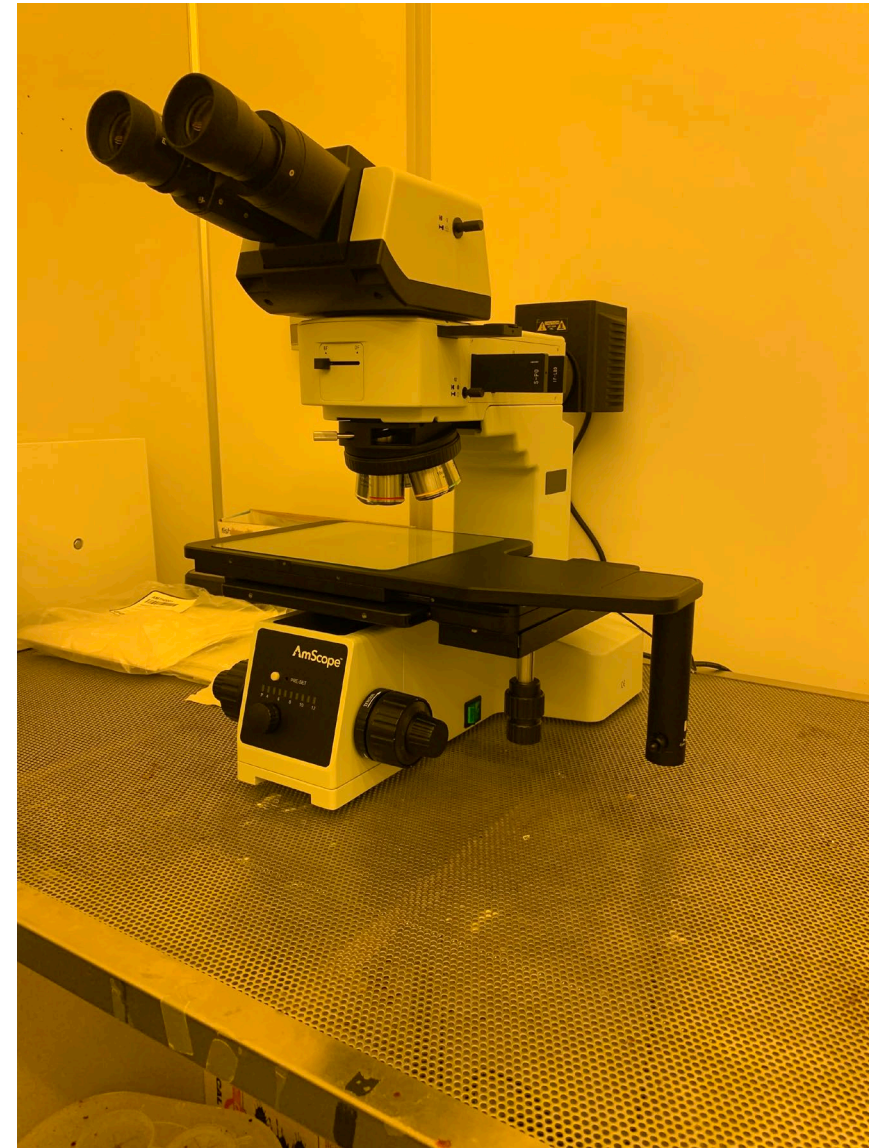
# Loop programming

Loop		Loop Steps		
Param No.	Height	up	clamp open	Step 1
1	600	up	clamp open	600
+	-	up	clamp open	Step 2
values 1 to 5,000 $\mu\text{m}$		up	clamp open	300
1	2	forward	clamp open	Step 3
4	5	up	clamp open	300
7	8	up	clamp open	Step 4
	0	up	clamp open	0
		up	clamp open	Step 5
		up	clamp open	0
		up	clamp open	Step 6
		up	clamp open	0
		up	clamp open	Step 7
		up	clamp open	0
		up	clamp open	Step 8
		up	clamp open	0
New Loop Param	Loop Name	OK		

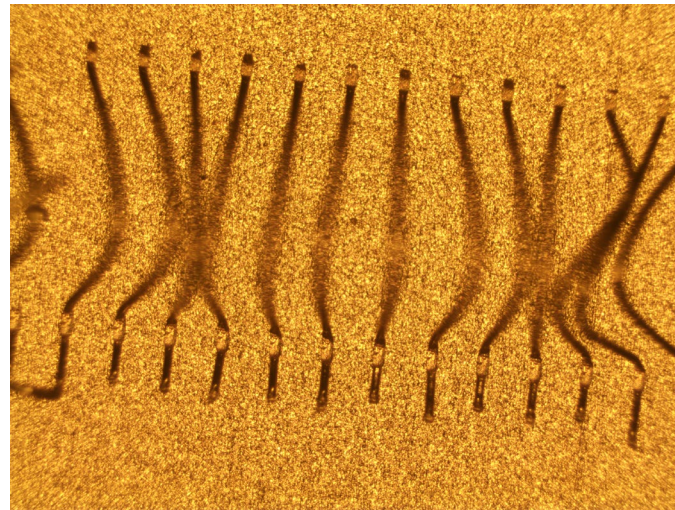
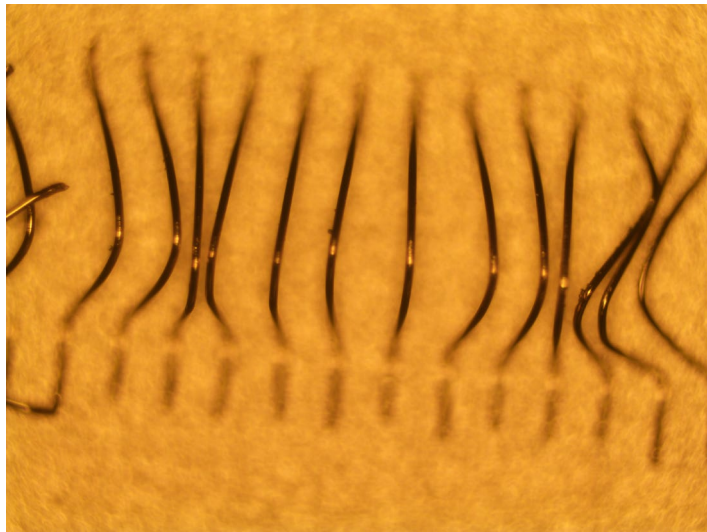
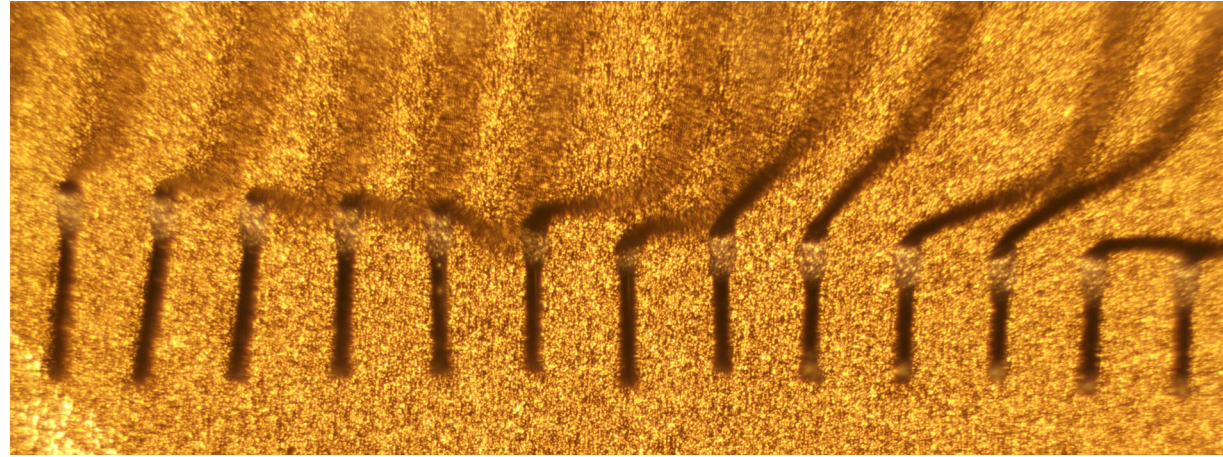
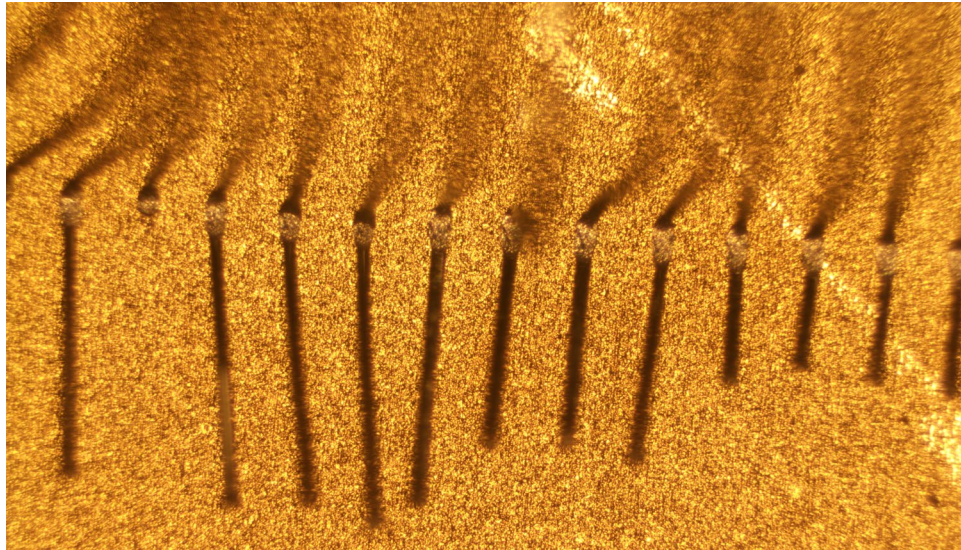


# Optical Microscope- AmScope ME600TZC

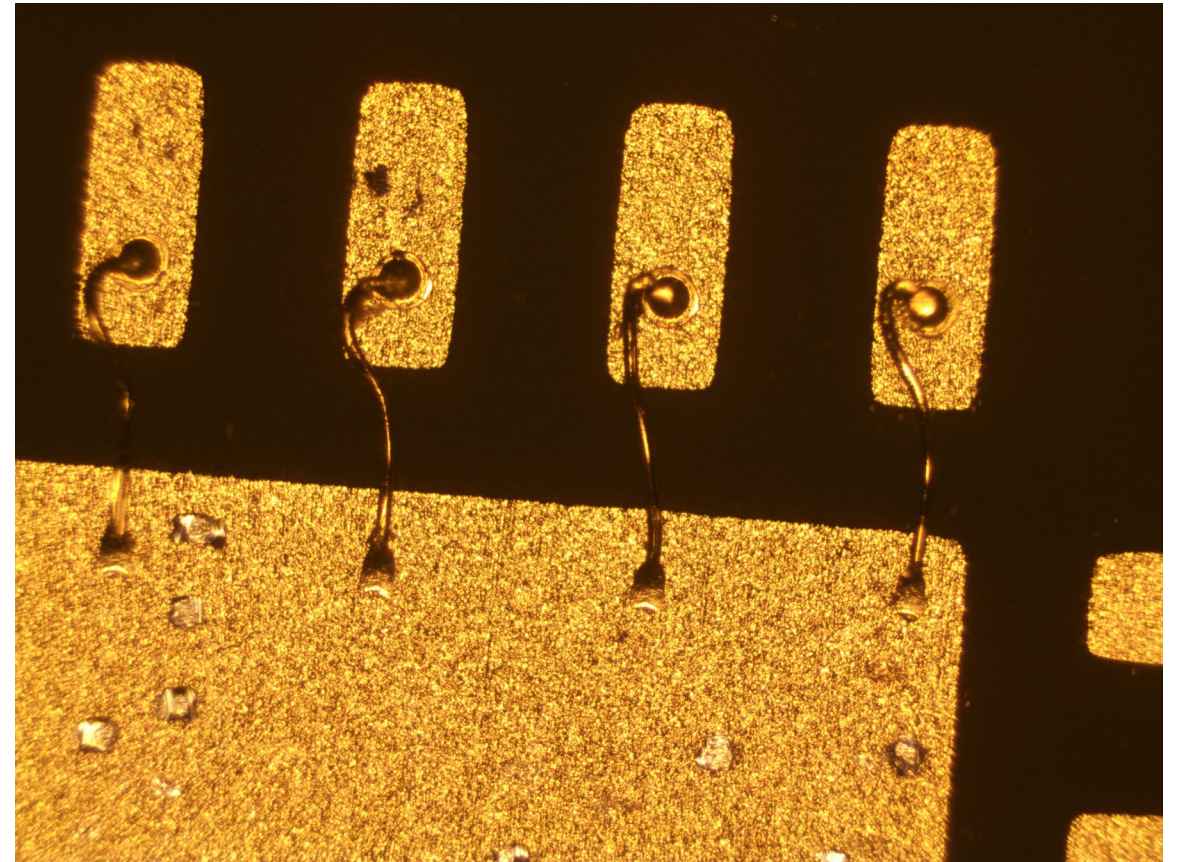
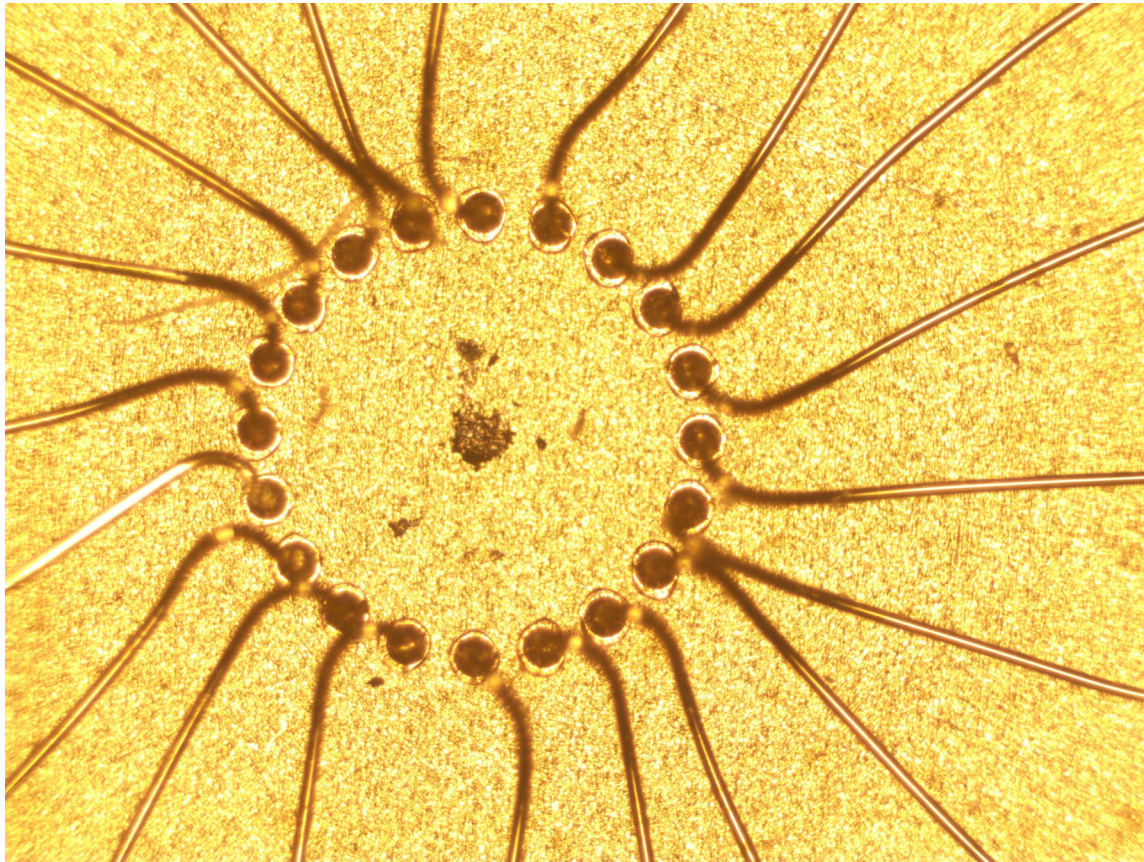
- 100W halogen lamp
- Bright Field, Dark Field, & polarization
- Objectives: 5X, 10X, 20X, 50X, & 100X
- 20MP CMOS Color Camera with video
- 6" mechanical stage with clutch control
- Software for color correction, time-lapse capture, & image stitching



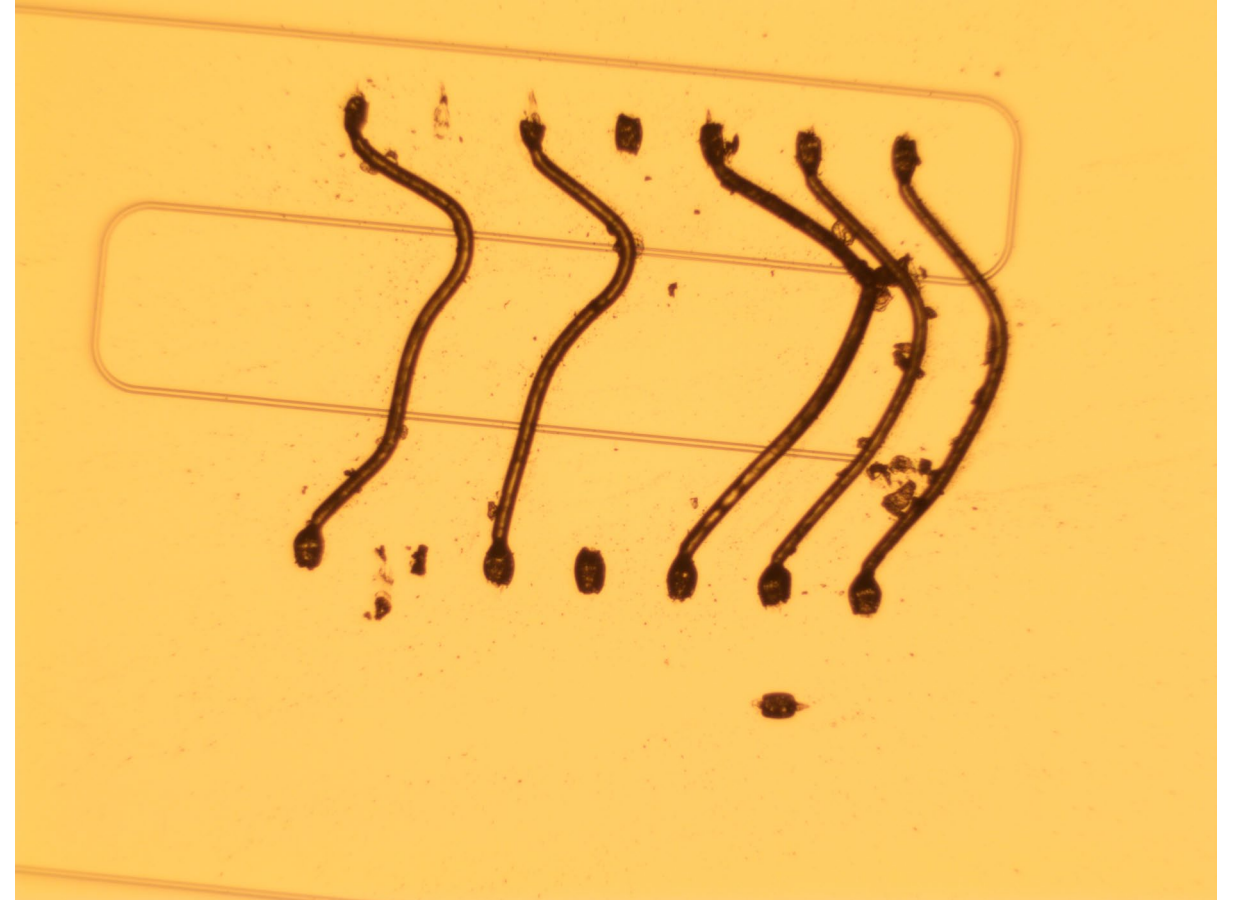
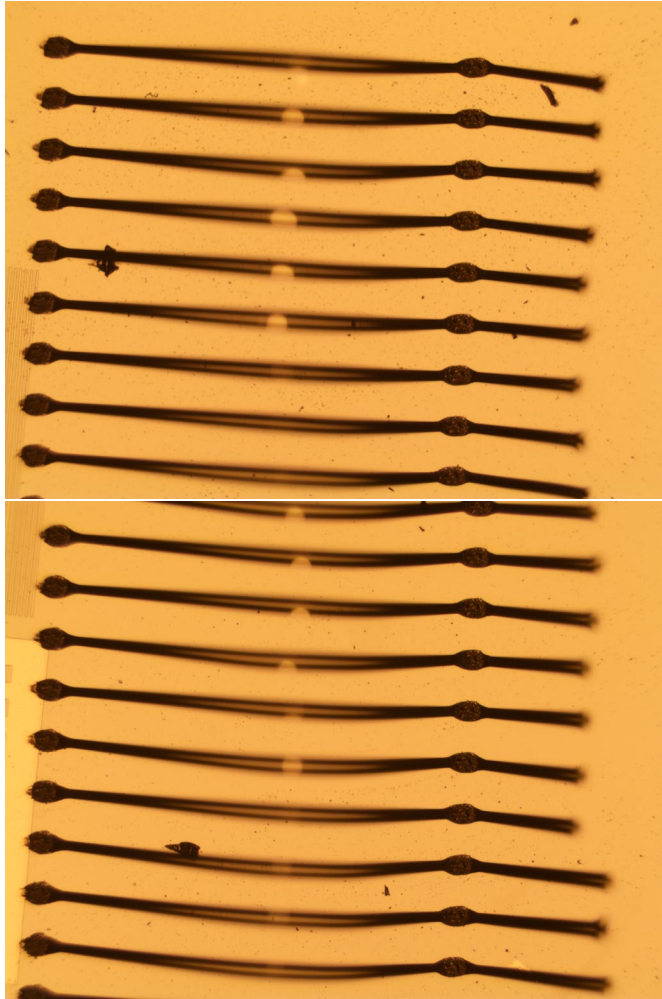
# Sample Images



# Sample Images



# Sample Images



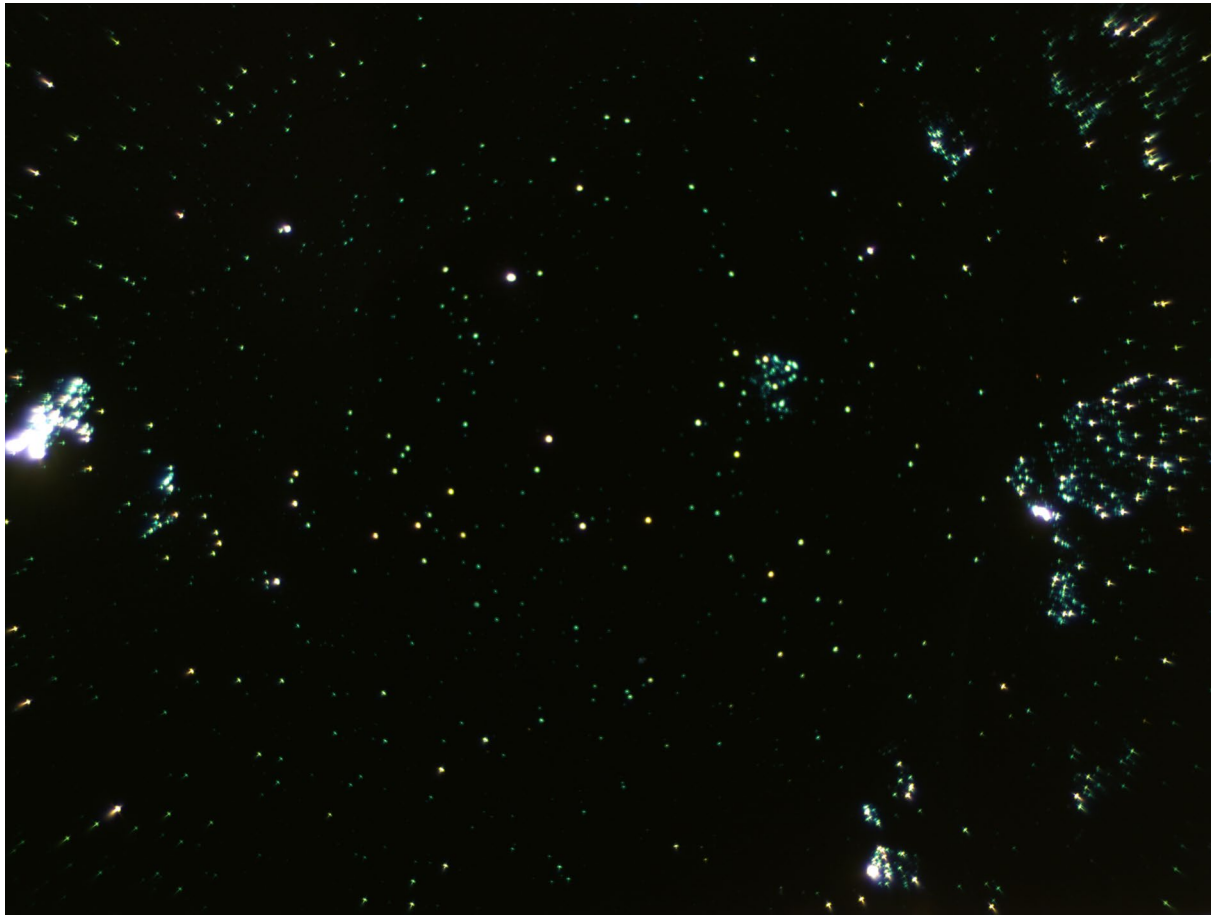
[4] SQMS Research Group

# Sample Images

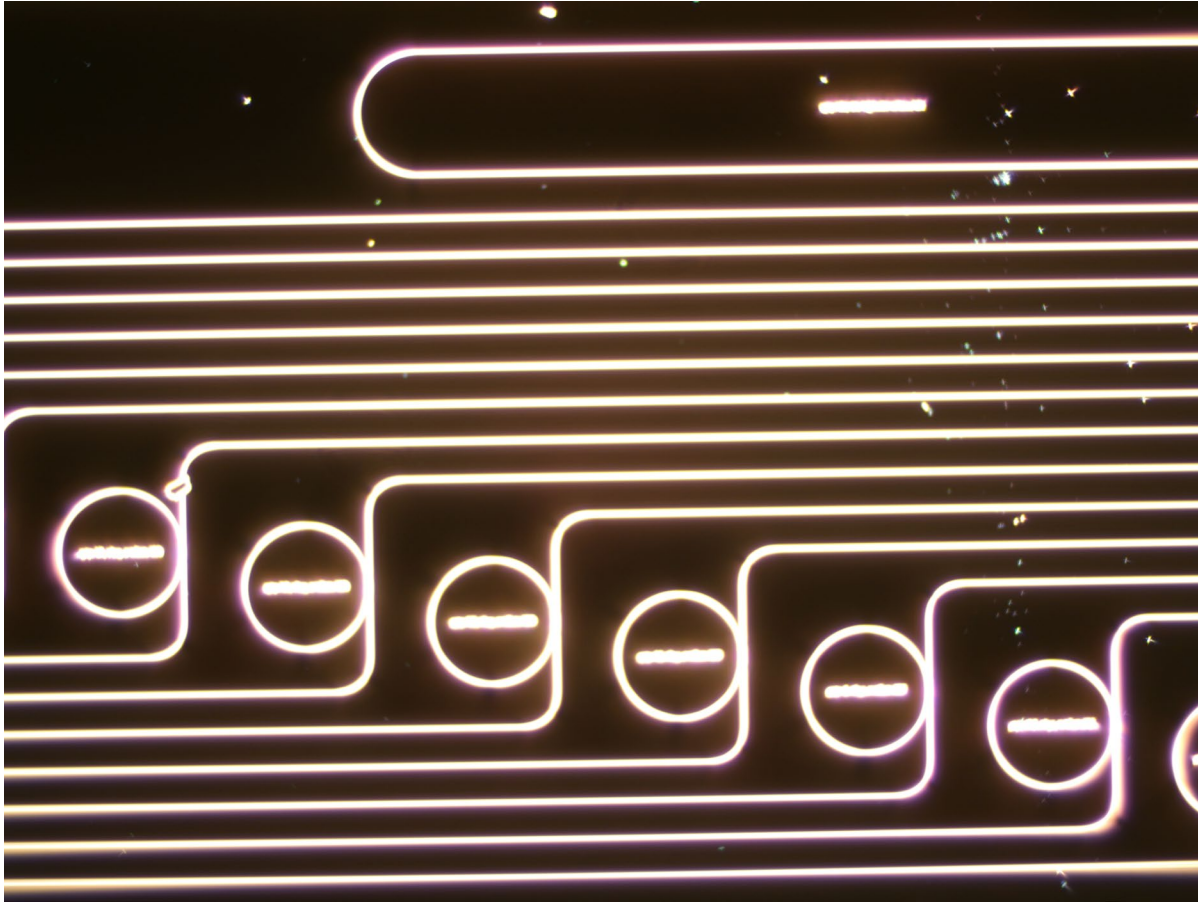


[5] Barton Research Group

# Sample Images



# Sample Images



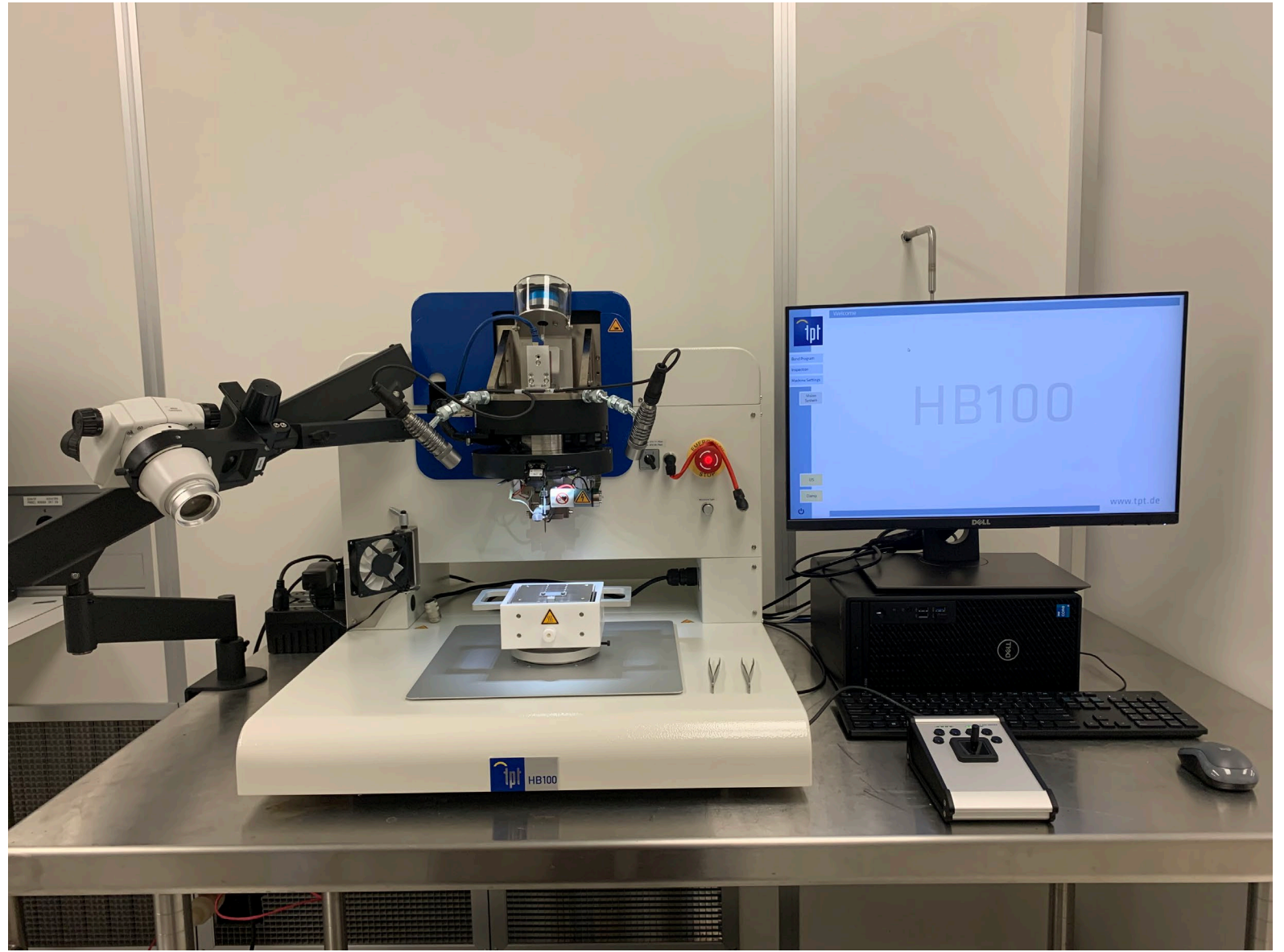
# Acid Bench/Heated Bath

- Liftoff
- Remover 1165 (Pg remover)
- RCA1
- KOH
- Existing NUFAB processes can be done in cook\*

\*With approval from NUFAB Staff



# Using the tool



# Contact Us



- [Diego.delavega@northwestern.edu](mailto:Diego.delavega@northwestern.edu)
- 847-467-2015
- General Questions: [nufab@northwestern.edu](mailto:nufab@northwestern.edu)



# Sources

- [1] Brown, M. (2020, November 10). *Fine Wire Bonding Explained | Ball & Wedge Bond | Knowledge Base*. Inseto UK. <https://www.inseto.com/fine-wire-bonding-explained-ikb-064/>
- [2] *Ribbon - F&S BONDTEC*. (2023, July 18). F&S BONDTEC. <https://www.fsbondtec.at/anwendungen/ribbon/?lang=en>
- [3] BERTHELOT, G. (2025, May 13). *The Resurgence of Stud-Bump Bonding in the Wire Bonding Market | Accelonix*. Accelonix. <https://accelonix.co.uk/resurgence-stud-bump-bonding-wire-bonding-market/>
- [4] SQMS Research Group
- [5] Barton Group
- [6] “HB100 - Automatic Wire Bonder.” *TPT Wire Bonder GmbH*, 23 July 2025, [www.tpt-wirebonder.com/hb100/](http://www.tpt-wirebonder.com/hb100/).