



Technical University of Sofia



- **24.10.1945** - founded the **State Polytechnic**
- today **the Technical University of Sofia** is the largest technical higher educational and research establishment in Bulgaria
- over **20 000 students**
- total number of **personnel: 2400**
- over **1800 full-time academic staff**
- **11 main faculties, 3 divisions for foreign education programmes, 3 branches in Plovdiv and Sliven**

Faculty of Electronic Engineering and Technology



- Department of Electronic Engineering
- Department of Power Electronics
- Department of Microelectronics
- Department of Chemistry

Department of Microelectronics

- Established in 1982 from the Research and Design Laboratory on Semiconductor and Hybrid Technologies
- 13 lecturers: 2 professors, 6 associate professors, 5 assistant professors, and 2 supporting staff, 31 PhD students



My students from the French Faculty visiting a foundry

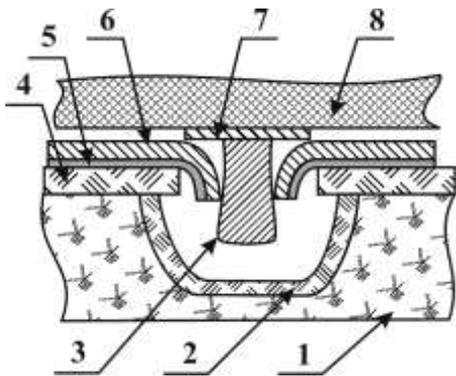


Research in the Department

- Design of Si ICs (*prof. Hristov ECAD laboratory*)
- Design of GaAs ICs and microwave MCMs (*prof. Arnaudov in collaboration with RaySat Bulgaria Ltd*)
- New packaging techniques (*prof. Videkov in collaboration with EPIQ, NanoTool and IvasTech*)
- Micro heats spreaders for mobile electronics and space applications (*prof. Tzanova in collaboration with NanoTech/INP Grenoble*)

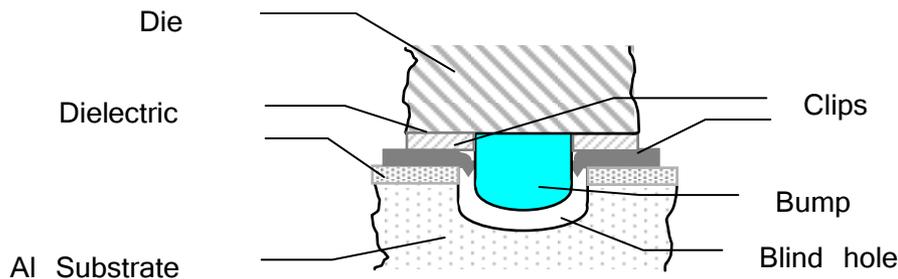
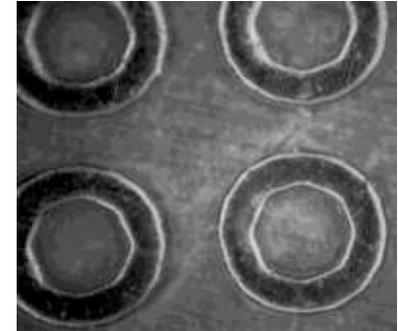
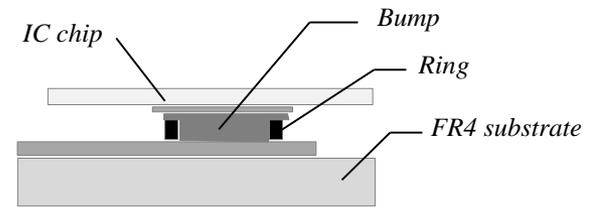
Flip Chip Technique with Clips-Bump Attachment (modified LIGA process)

Blind hole clips



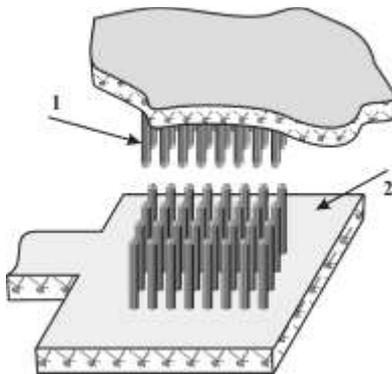
- Al substrate
- Wick oxidation
- Bump of the chip
- Anodised insulating layer
- Adhesive layer
- Conductive layer of the ring
- Contact pad of the chip
- Chip

External clips

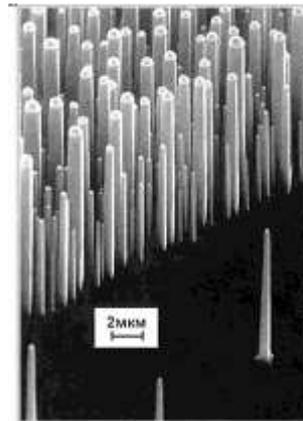


Brush Type Bonding with Nano-Needle Structure for Carrier Wafer Bonding

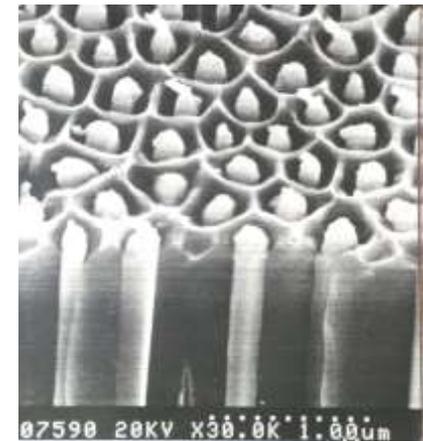
Solder free dry assembling method at room temperature with reduced requirements for axes coincidence and decreased irregularity of the currents distribution.



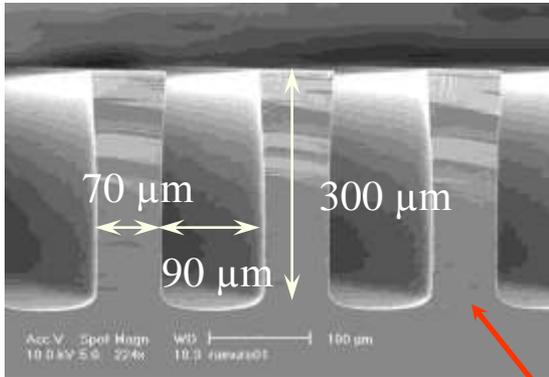
Schematic presentation



Electro-chemically grown nanoneedles in a nanomatrix of anodised Al

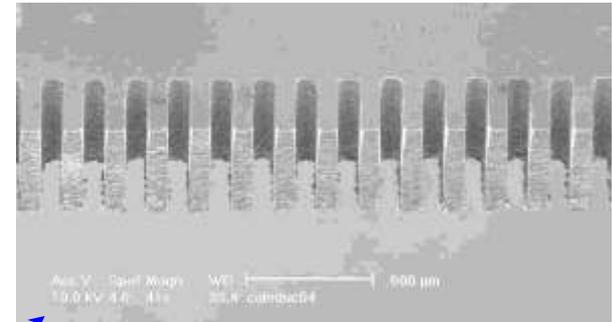
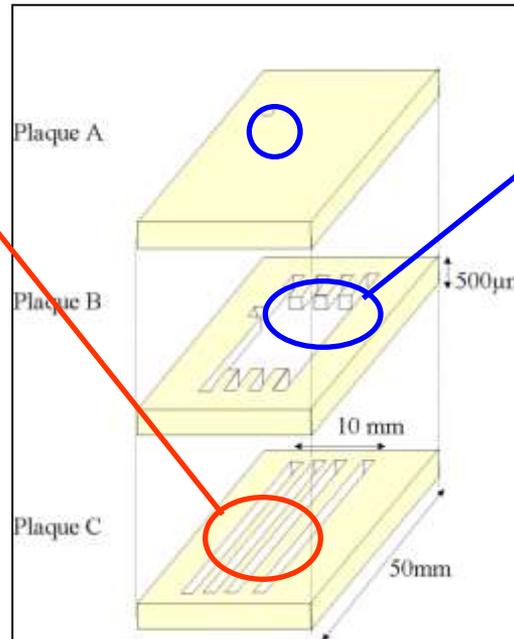


Silicon Heat Spreaders

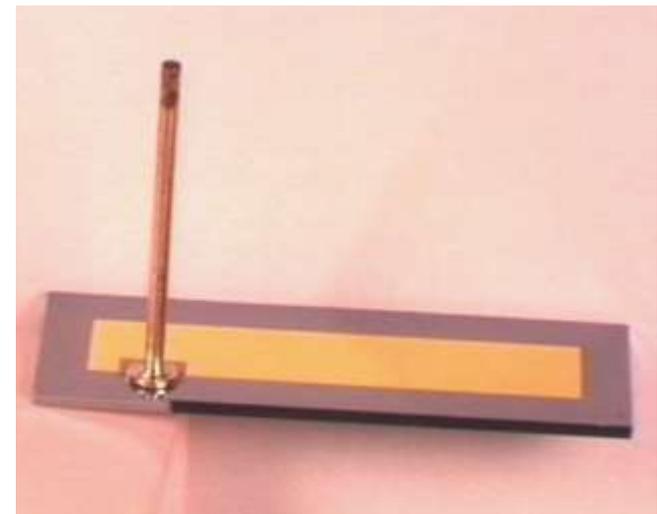
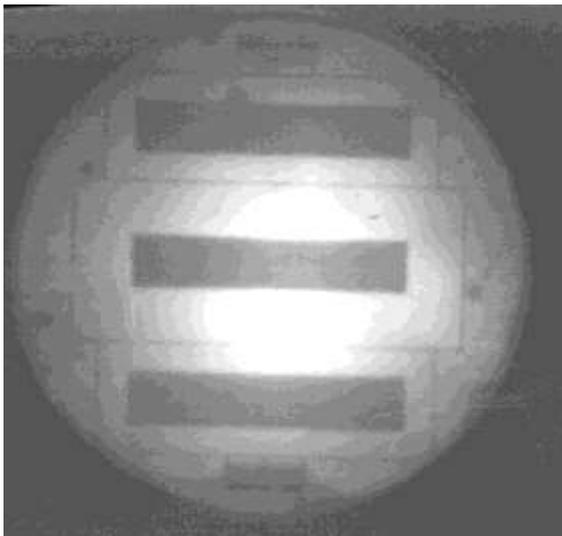


Groove (dry etching)

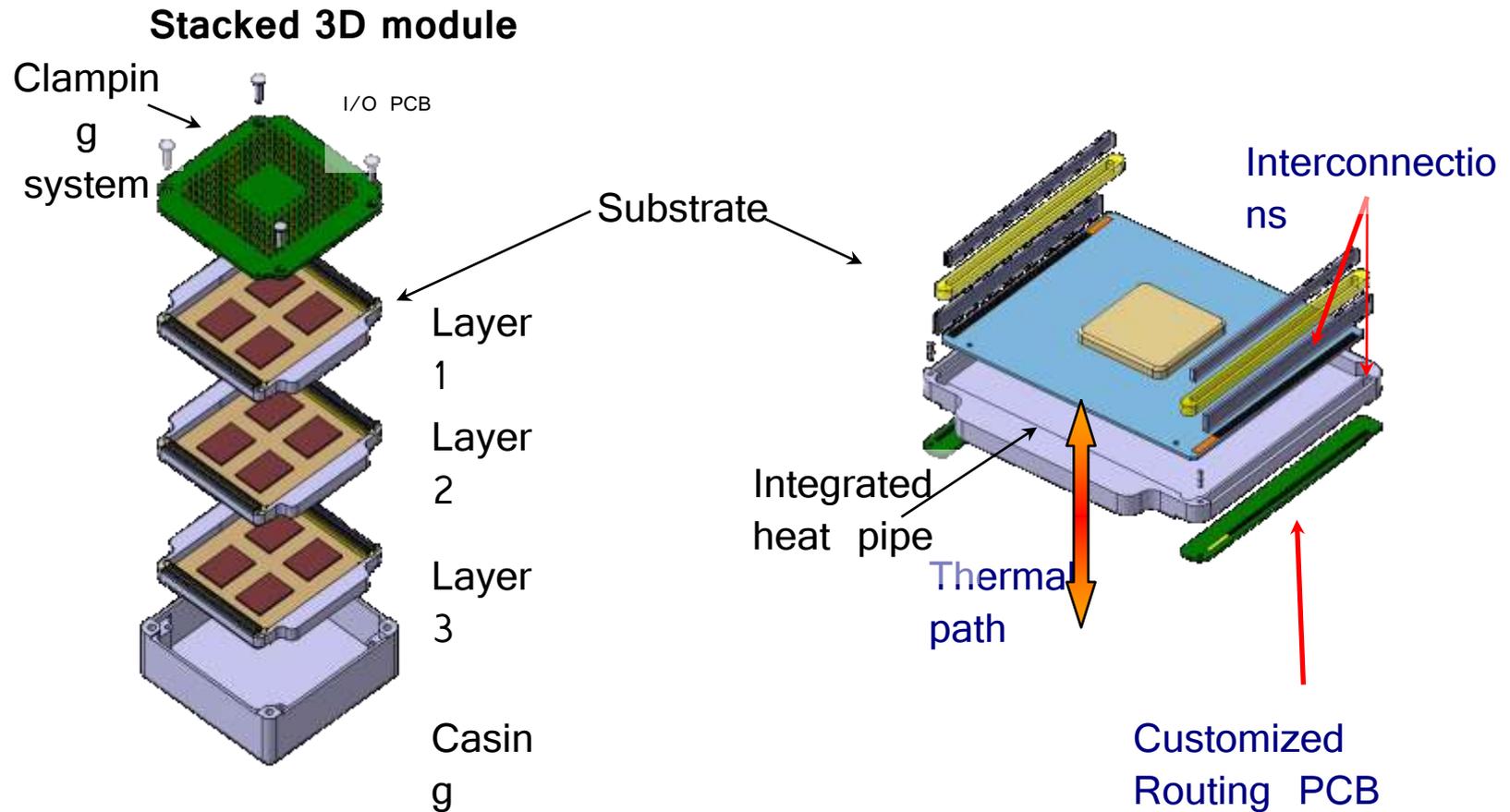
Assembling of the 3 Si plates



Peripheral channels (laser)



Microcooling project: 3D packaging for avionics applications



Sintered powder heat pipe for 3D packaging

