



An Australian Government Initiative to provide nano and micro-fabrication facilities for Australia's researchers

# General Induction to ANFF ACT Node

### Induction to ANFF ACT Node



- Lab Locations and Staff
- Hazards / Work Health & Safety Matters
  - Emergency Procedure
  - Access Rules
  - General Rules
- School and Lab tours





### Location



Erich Weigold Building #58b

Sputter Gas Shed

**Pumps Shed** 









### **ACT Node Staff**





Li Li FIB Engineer



Gayatri Vaidya EBL Engineer



Kaushal Vora Processing Engineer



Mykhaylo Lysevych MOCVD Engineer



Olivier Lee Cheong Lim
SEM Engineer



Sue Berkeley Node Admin



Fouad Karouta Manager



Chennupati Jagadish Director





### General Access Rules



- Lab-doors: Only trained users will get access to the labs during business hours (8:00 - 18:00)
- Access after hours (only to EBL, SEM-CL and FIB): through ANFF staff you get an after hours card that you MUST return the next working day.





## **Location of Toilets**



Closest: Level 3 Erich Weigold Building







# RSPE Reception & First Aid



Update regularly your card every two weeks



### School First Aid Officers







### Hazards at the Node



- Materials Safety Data Sheets (MSDS) Sheets on lab doors
- Do not use headphones in Labs
- No Food Nor Drinks in Labs, water allowed at lab entrance









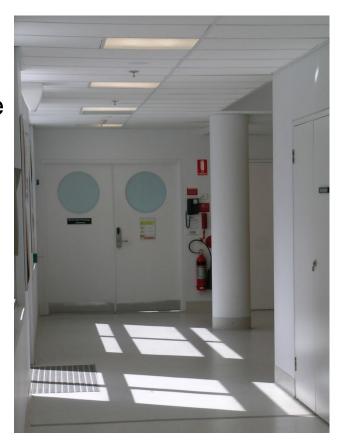


## Location of Fire extinguishers



- EBL Laboratory
- Level 2 corridor, Weigold Building
- Near ICP door (powder for flammable gases)









## **Emergency Procedure**



### Two-Stage Alarm:

- 1. Repetitive 440 Hz "beep" "beep": Prepare to evacuate
- Repetitive 500 to 1200 Hz ascending "whoop":
  - Evacuate immediately through the shortest way
  - If in the clean room: just leave with your CR/Lab garments/clothes if any

https://physics.anu.edu.au/intranet/OHS/guide/chapter.php?id=6





## **Emergency Procedure**



 Evacuation can be triggered by an alarm originating from ANFF Labs as well from elsewhere in the RSPE School and it can be related to: fire, chemicals, toxic gases.

Exit through the side door.

- Assembly Point: Outside RSPE across Mills Road
- Also on Garran Road near Nuclear Phys



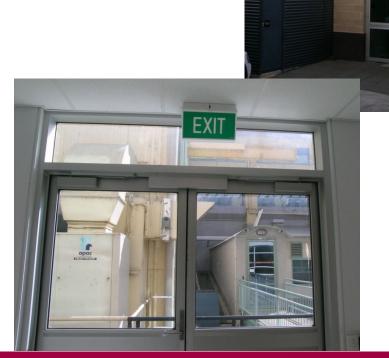




### Alarm from the ANFF Lab



- Emergency Exits:
   Side door to ANFF Labs
- EXCEPT
   when yellow light above
   door is flashing: potential
   gas leakage in gas shed.
   you must evacuate through
   an alternative route







## Specific Hazards at the Node



- Specific Hazards to the ACT Node:
  - Resists, solvents, developers in EBL Fume Hood (refer to MSDS Sheets)
- Hazardous gases in use:
  - ICP-RIE: Cl<sub>2</sub>, BCl<sub>3</sub>, SiCl<sub>4</sub> (corrosive), CH<sub>4</sub>, H<sub>2</sub> (flammable)
  - PECVD: SiH<sub>4</sub>,(pyrophoric) NH<sub>3</sub> (corrosive)
  - PA-ALD: NH<sub>3</sub>, H<sub>2</sub> & Metal-organics





# Using Gases (ICP/PECVD/E-beam/Sputter/ALD)



- Equipment Monitoring Control Cabinet
- After getting the adequate training on one of the tools, your card will be programmed on our controller
- Need to swipe your card to remove interlock and use an equipment
- For ICP, PECVD, ALD, Mini-sputter, Ebeam Evap: open the pneumatic valves needed for your process
- When finished turn off the gases and the system







## **Active Gas Monitoring**



- Two levels alarm:
  - 1st only audible in Lab
  - 2<sup>nd</sup> may trigger general evacuation in ANFF Labs and in School
- 2<sup>nd</sup> level alarm will abort all processes and shut down pneumatic valves
- A general alarm/evacuation (from School) will also cause shutting down all gases and processes







## Cl<sub>2</sub> Gas Panel



Very high standard ultra high purity stainless steel components used in gas panels

Every cylinder is placed in an exhausted cabinet

When you open a gas from labs you open the pneumatic high pressure valve









## Gas Sensors & Monitoring



#### Currently 26 gas sensors are in use:

- Gas Shed:
   1x flammable open space (H<sub>2</sub>:N<sub>2</sub>, and H<sub>2</sub>:Ar)
   5x (Cl<sub>2</sub>, BCl<sub>3</sub>, CH<sub>4</sub>/H<sub>2</sub>, SiH<sub>4</sub>, NH<sub>3</sub>) in exhaust cabinets
- ALD, ICP & PECVD gaspod exhaust
   7x (Cl<sub>2</sub>, BCl<sub>3</sub>, 2x flammable, SiH<sub>4</sub>, 2x NH<sub>3</sub>)
- 3. Open space ICP/PECVD Lab: 5x (Cl<sub>2</sub>, BCl<sub>3</sub>, CH<sub>4</sub>/H<sub>2</sub>, SiH<sub>4</sub>, NH<sub>3</sub>)
- 4. Open space ALD Lab: 2x (flammable, NH<sub>3</sub>),
- 5. 3x monitoring scrubbers of ALD, ICP & PECVD + 3x O<sub>2</sub> sensors in all 3 Labs









## Gas Sensors & Monitoring



- O<sub>2</sub> sensor in all labs: W-2.04, W-2.05, W-2.06
   If oxygen level drops below 18.5% an evacuation alarm will sound
- Only gas sensors in open lab space trigger "Lab Evacuation"
- Active gas monitoring in summary:
  - Gas alarm from ANFF Labs: results in shutting all pneumatic valves and processes
  - Any evacuation alarm from RSPhys also results in shutting down all pneumatic valves and processes







### EBL Lab

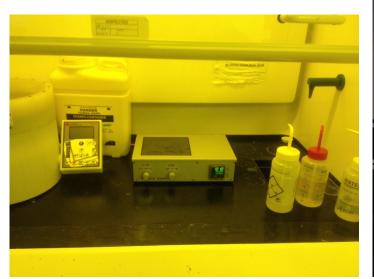


Check MSDS sheets of resists, developers, solvents, other chemicals.

Also: Ellipsometer, NIL, Hot Embosser, Barrel Etcher

Fume Hood & Safety Shower + Eye Shower











# Sputter Lab / KOH Station







KOH Station for etching Si

Ultrasonic Station for masks cleaning





### SEM-CL



# SEM-CL located adjacent to CAM and CT Lab at JCSMR

#### Access rules:

- ANFF induction
- CAM induction (through SEM officer)
- Specific training on the system







## Other equipment/Facility



- Dektak Surface Profiler / JC-4.25
- Thermal Evaporator / JC-4.25
- Rapid Thermal Annealing / JC-4.24
- Vacuum Oven (max 400°C) / JC-4.24
- Chem Lab (EME) / JC-4.26





### General



- Follow the appropriate dress code and footwear for each of the ANFF Labs.
- Independent access to ANFF equipment can only occur AFTER being authorised by an ANFF staff member.
- Booking access to instruments will only be provided AFTER accomplishing this induction.
- Acknowledge access to ANFF ACT Node in your publications





### General



- It is the USER responsibility to read the RSPE General Induction Procedures, these can be found at the following site: <a href="https://physics.anu.edu.au/intranet/">https://physics.anu.edu.au/intranet/</a>
- Breaching any of the above mentioned rules may lead to access suspension.

