Microelectronics Prototyping and Testing (MPT) Lab

- Microelectronics Design and Characterization (MDC) Lab
  – BRG 321
- Rapid Prototyping Support (RPS) Lab
  – BRG 310 C, D

LASSONDE SCHOOL OF ENGINEERING | YORK UNIVERSITÉ UNIVERSITY

Microelectronic Design and Characterization (MDC) Lab

- BRG 321

Agenda: Safety in MDC Lab

- Personal Safety
- Equipment Safety
- House keeping

General Safety Rules

Safety is a major concern in Engineering and Industrial professions.

- As engineers you will be required to protect and promote the health, safety and well-being of the community and the environment.

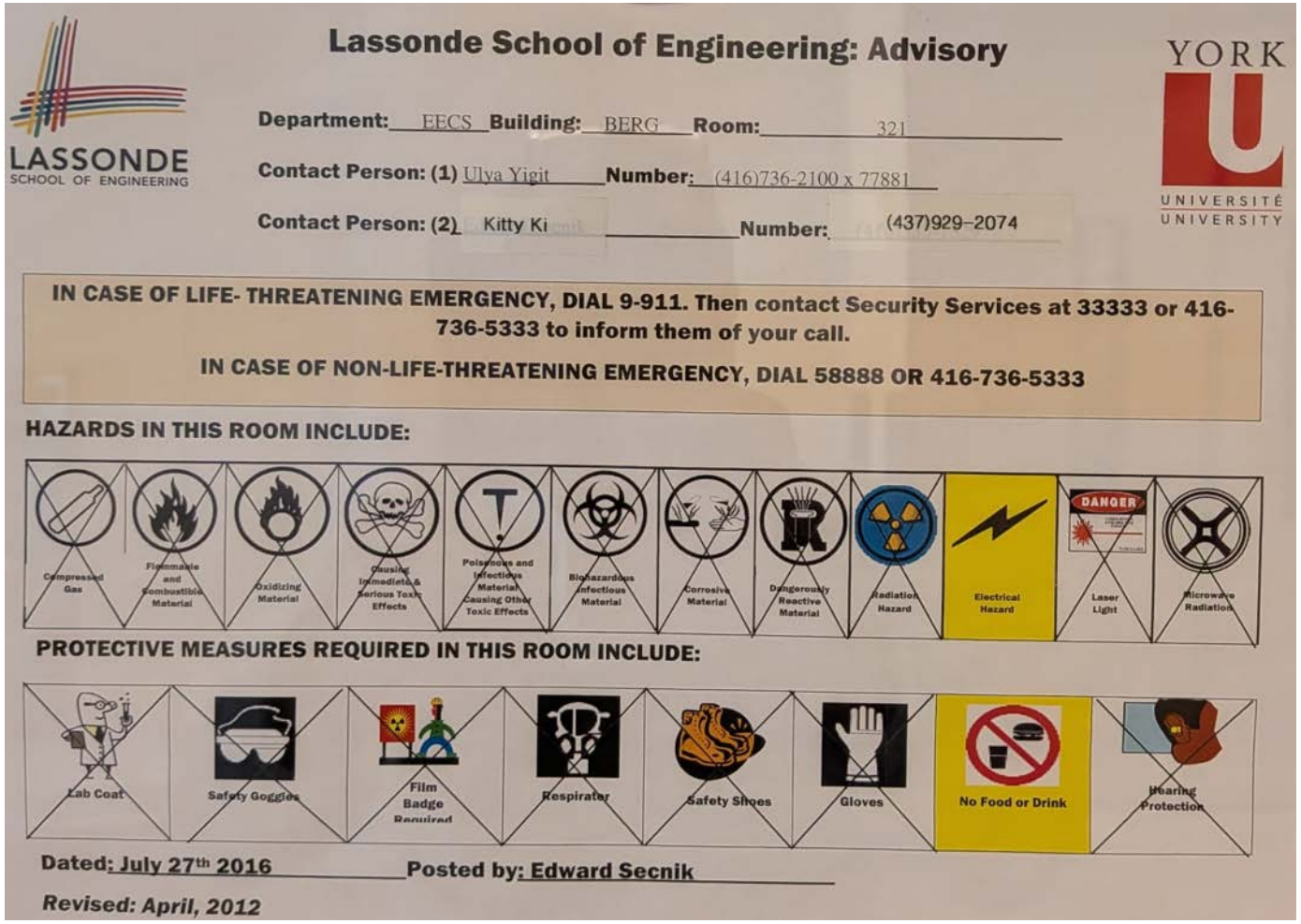
Working in a safe manner is more important than completing your lab.

- First and foremost, you are responsible for your own safety.
- Familiarize yourself with the lab equipment and your surroundings.

Do not do anything, which puts anyone's safety at risk.

- No horseplay inside the lab.
- For any confusion, then please ask the lab-tech.

Personal Safety



Lassonde School of Engineering: Advisory

LASSONDE SCHOOL OF ENGINEERING

YORK UNIVERSITÉ UNIVERSITY

Department: EECS **Building:** BERG **Room:** 321

Contact Person: (1) Ulya Yigit **Number:** (416)736-2100 x 77881

Contact Person: (2) Kitty Ki **Number:** (437)929-2074

IN CASE OF LIFE- THREATENING EMERGENCY, DIAL 9-911. Then contact Security Services at 33333 or 416-736-5333 to inform them of your call.

IN CASE OF NON-LIFE-THREATENING EMERGENCY, DIAL 58888 OR 416-736-5333

HAZARDS IN THIS ROOM INCLUDE:

Compressed Gas; Flammable and Combustible Material; Oxidizing Material; Causing Immediate & Serious Toxic Effects; Poisonous and Infectious Material Causing Other Toxic Effects; Biohazardous Infectious Material; Corrosive Material; Dangerously Reactive Material; Radiation Hazard; Electrical Hazard; DANGER Laser Light; Microwave Radiation

PROTECTIVE MEASURES REQUIRED IN THIS ROOM INCLUDE:

Lab Coat; Safety Goggles; Film Badge Required; Respirator; Safety Shoes; Gloves; No Food or Drink; Hearing Protection

Dated: July 27th 2016 **Posted by: Edward Secnik**

Revised: April, 2012

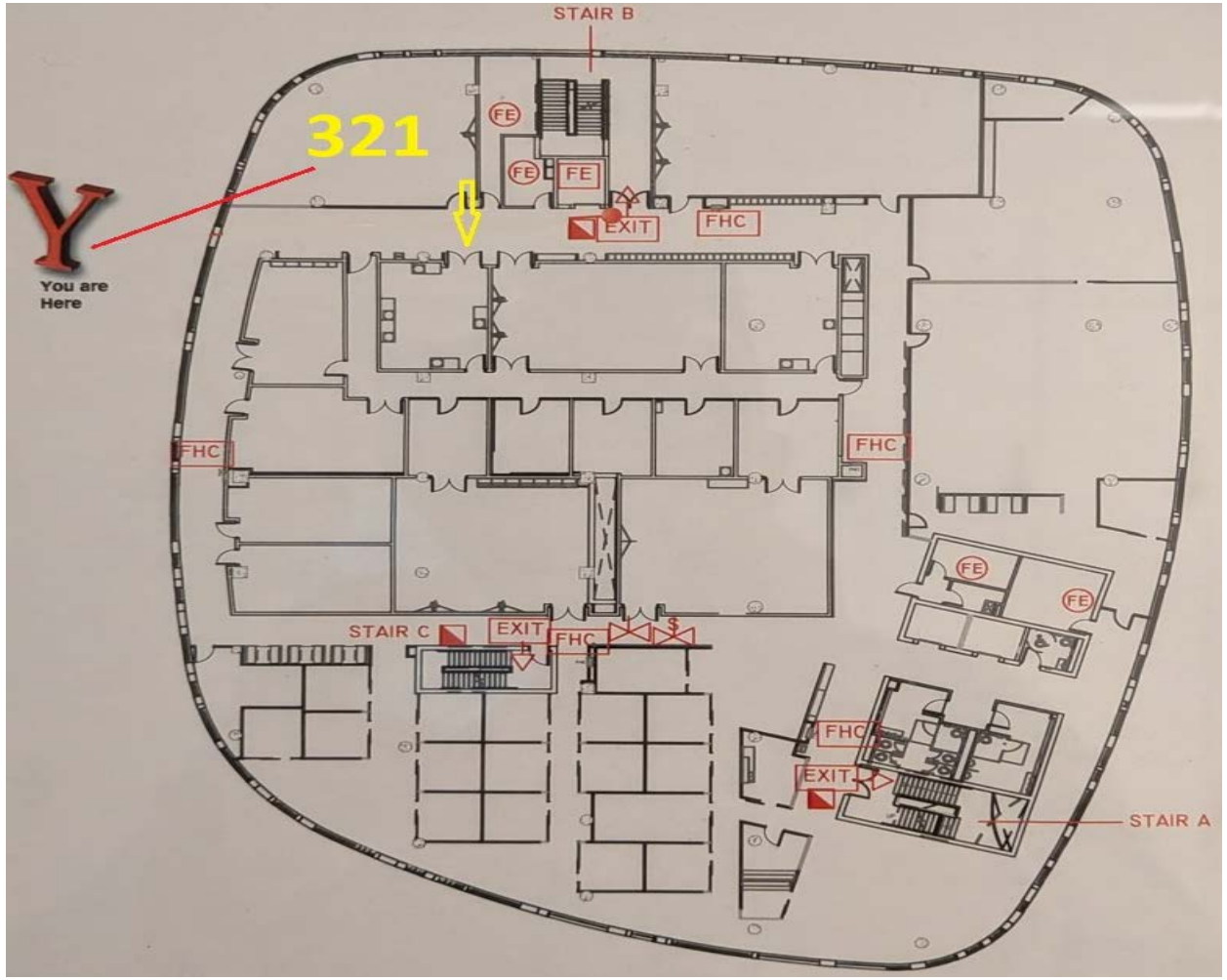
The workbenches have 110VAC powered equipment and power-bars.

- Do not use un-grounded equipment. DC adapters are excepted.
- Don't cycle equipment power directly from the plugs. Use their switches.

Hazard Advisory

- Flammable Materials
- Electrical Hazard

Personal Safety



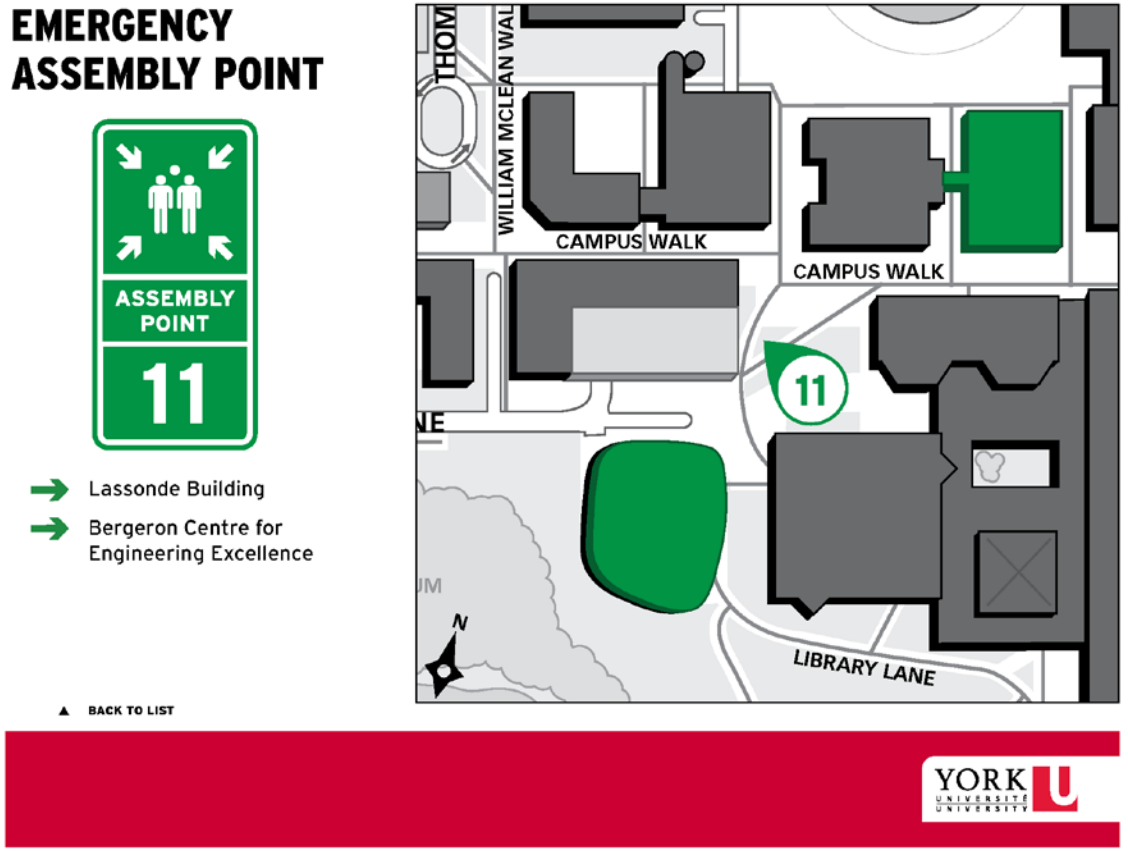
Know the emergency exit.

- Opposite of the room exit
- End of the corridor

Personal Safety

EMERGENCY ASSEMBLY POINT (EAP)

- EAP is designated areas on campus, which are to be used in the case of emergency situations.
- Safe area for individuals to stand, while waiting for emergency personnel to respond.
- **For Bergeron Building EAP# 11 ‘Campus Walk (central area)’**



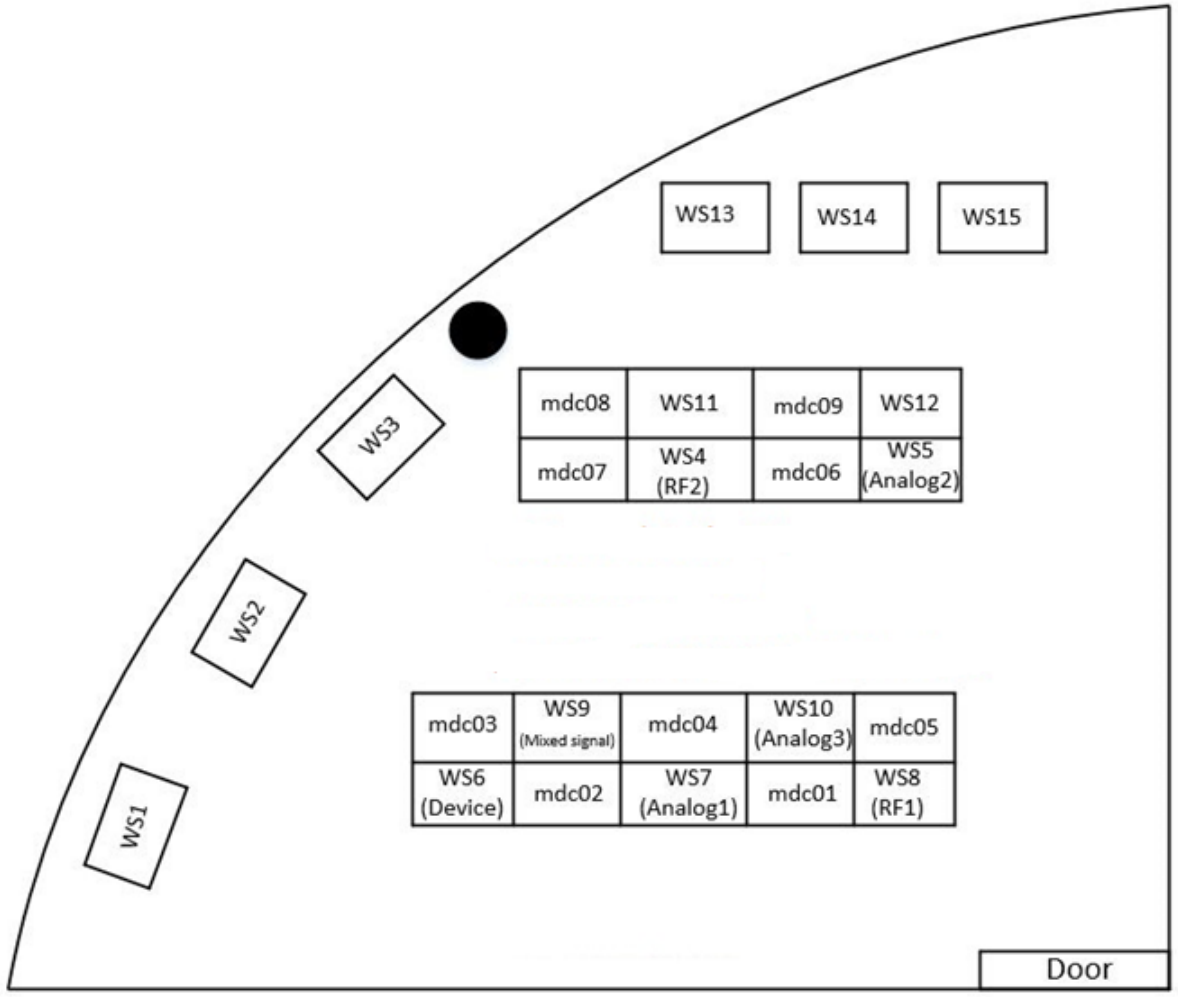
Personal Safety

EMERGENCY ASSEMBLY POINT (EAP)

- In case of ringing alarm, leave the lab urgently and proceed to Emergency Assembly Point (EAP)

- For Bergeron Building EAP# 11 ‘Campus Walk (central area)’
- Wait for further instructions

Workstations in MDC Lab



- 15 Workstations
- 9 desktops (Win/Unix)

Equipments in MDC Lab

https://mpt.eecs.yorku.ca/

Workstation1
●TS150 manual probe station ● TS200-SE Analytic Probe Station

Workstation2
● TPT HB16 wire bonder

Workstation3
● PACE TF1800 rework station

Workstation4 (RF2)
● Wideband Scope Infiniium DSA91304A ● Rohde & Schwarz RF Signal Generator (SMB 100A) (40 GHz) ● Agilent 81134A Pulse Pattern Gen. ● Agilent E3630A (3-ch Power Supply) ● TTi MX100T DC Power Supply Triple Out.

Workstation5 (Analog2)
● Tek MDO/MSO 3024 (4+16, 200MHz) ● Agilent E3630A (3-ch Power Supply) ● TTi MX100T DC Power Supply Triple Out. ● Arb waveform generator (Keysight 33500B) ● Keithley 2110-120 Digital Multimeter ● Keithley Source Meter 2602B ● KH7008 low noise preamplifiers

Workstation6 (Device)
● Keithley 4200 SCS Parameter Analyzer

Equipments in MDC Lab

https://mpt.eecs.yorku.ca/

Workstation7 (Analog1)

● Tek MDO/MSO 3024 (4+16, 200MHz) ● Agilent E3630A (3-ch Power Supply) ● TTi MX100T DC Power Supply Triple Out. ● Arb waveform generator (Keysight 33500B) ● Keithley 2110-120 Digital Multimeter ● SRS 780 spectrum analyzer ● KH7008 low noise preamplifiers

Workstation8 (RF1)

● PNA-X Microwave Network Analyzer ● Agilent N5172B (Vector Signal Gen.) 6GHz ● Keysight MSOX3104 ● Agilent E3630A (3-ch Power Supply) ● TTi MX100T DC Power Supply Triple Out.

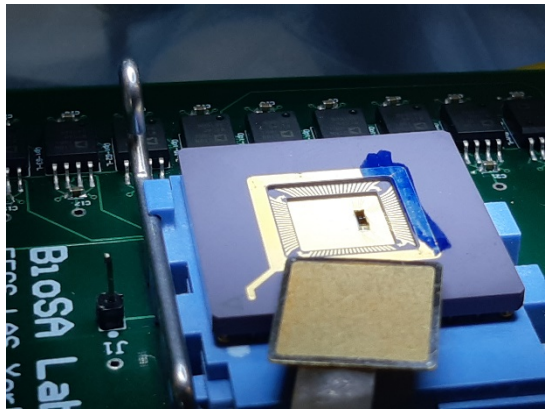
Workstation9 (Mixed Signal)

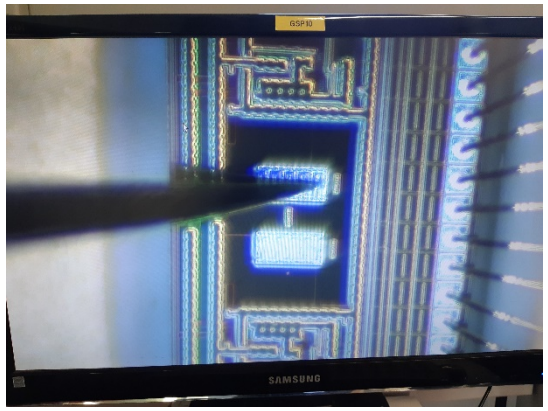
● Agilent 16852A Logic Analyzer ● Keysight MSOX3104 ● Agilent E3630A (3-ch Power Supply) ● TTi MX100T DC Power Supply Triple Out. ● Agilent 34401A (Multimeter) ● Arb waveform generator (Keysight 33611A)

Workstation10 (Analog3)

● Tek MDO/MSO 3024 (4+16, 200MHz) ● Arb waveform generator (Keysight 33611A) ● Agilent E3630A (3-ch Power Supply) ● TTi MX100T DC Power Supply Triple Out. ● Agilent 34401A (Multimeter)

Workstation 1: Manual Probe Stations

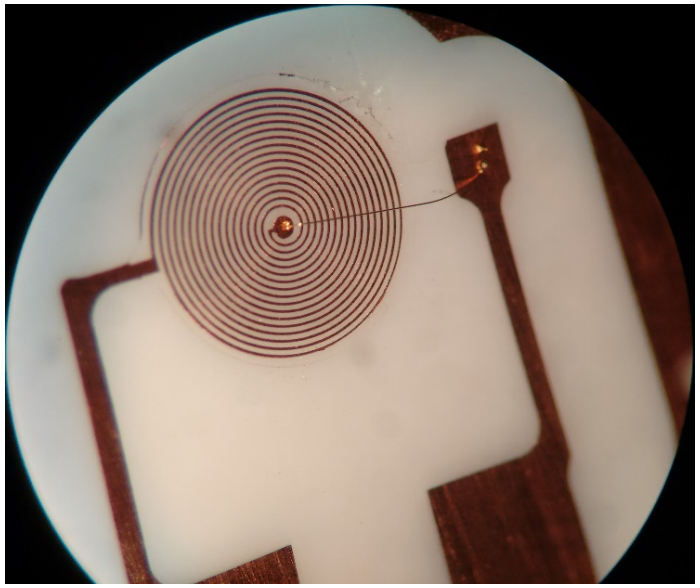




WORKSTATION-1:
ITS150-RF26 & TS200-SE:

- Acquires signals from internal nodes of semiconductor device
- Measures RF signals at 26 GHz
- Accommodates up to 10 DC or 4 RF probes
- Shield Environment for ultra-low noise, accurate DC/CV, RF, high power measurement
- Device characterization and modeling, RF and mmW wafer level reliability, failure analysis, IC engineering, MEMS and high power
- Advanced EMI/Noise/Light-Tight shielding

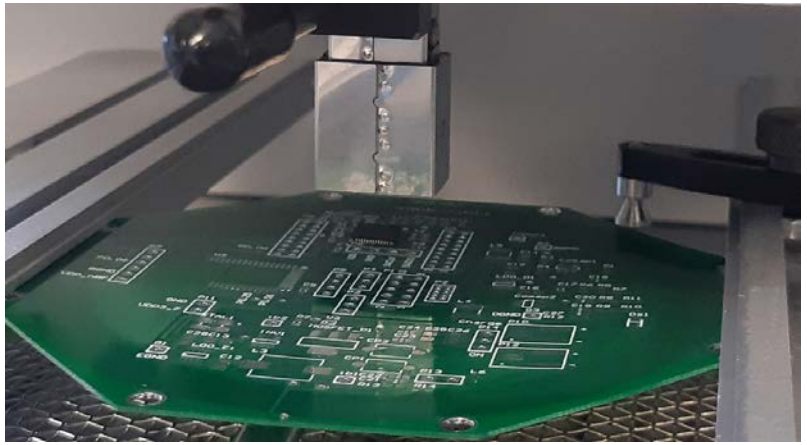
Workstation 2: Wire Bonder



WORKSTATION-2: TPT HB16:

- Semi-automatic bonder for wedge bonding, ball bonding and ball bumping
- Motorized Y-Z axis and wire spool
- Repeatable loop profiles and loop programming
- Gold, Aluminium, Silver & Copper wire
- Automatic bond height adjustment
- Electronic wire clamp – up & down
- Control variables: force, ultrasonic power, time and temperature

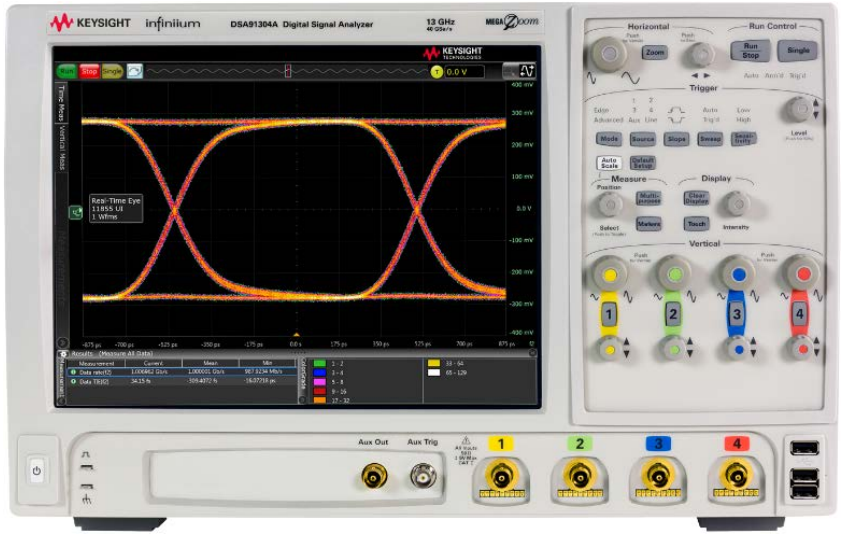
Workstation 3: Rework Station



WORKSTATION-3: PACE TF1800:

- BGA & SMD rework system
- Highest quality joints, 300W
- Reaches target temperature instantaneously
- Fast heat up and rapid cool down – faster throughput,
- Ultra precise placement capability – 28 µm placement accuracy
- Automated high definition vision overlay system with 1080p, 240x zoom capability
- Top heater: 100C – 400C, Bottom heater: 100C – 221C

Workstation4 (RF): Wideband scope, Pulse Pattern Generator



WORKSTATION-4:

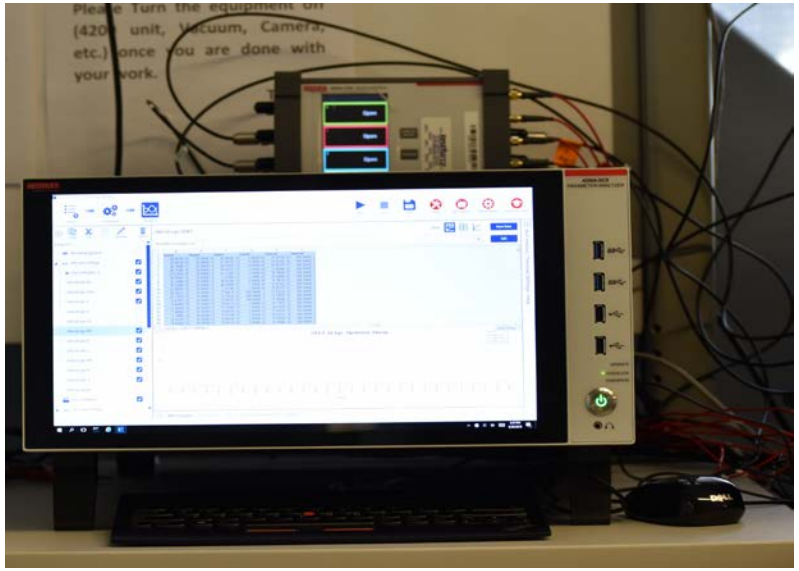
Keysight Infiniium DSA91304A

- 13 GHz, 4 Analog Channels
- Bandwidth 13 GHz
- Max Memory Depth 1 Gpts
- Max Sample Rate 40 GSa/s
- ADC Bits 8 bits
- Minimum Rise/Fall Time 32 ps

Keysight 81134A PPG

- 3.35 GHz, dual-channel, Low jitter
- Fast rise times < 60 ps
- For critical timing and performance requirements
- High-speed serial bus applications like PCI Express or Serial ATA
- Characterization of devices
- Generate application-specific signal levels
- Test DUT instead of the pulse or data source

Workstation6: Semiconductor Parameter Analyzer



WORKSTATION-6: Keithley 4200 Parameter Analyzer

Parametric insight, fast and clear

- DC I-V, C-V, and pulsed I-V, user-modifiable tests in Clarius
- Real-time parameter extraction, data graphing, analysis

Accurate C-V Characterization

- low-noise capacitance (10e-15) measurements from 1 kHz to 10 MHz
- Measures conductance, and admittance
- Measure on up to four channels with the 4200A-CVIV Multi-switch

Measure. Switch. Repeat.

- CVIV Multi-Switch: Automatically switches between I-V and C-V measurements without re-cabling or lifting the prober tips.
- Move C-V measurement to any device terminal without re-cabling

Stable low current measurements for I-V Characterization

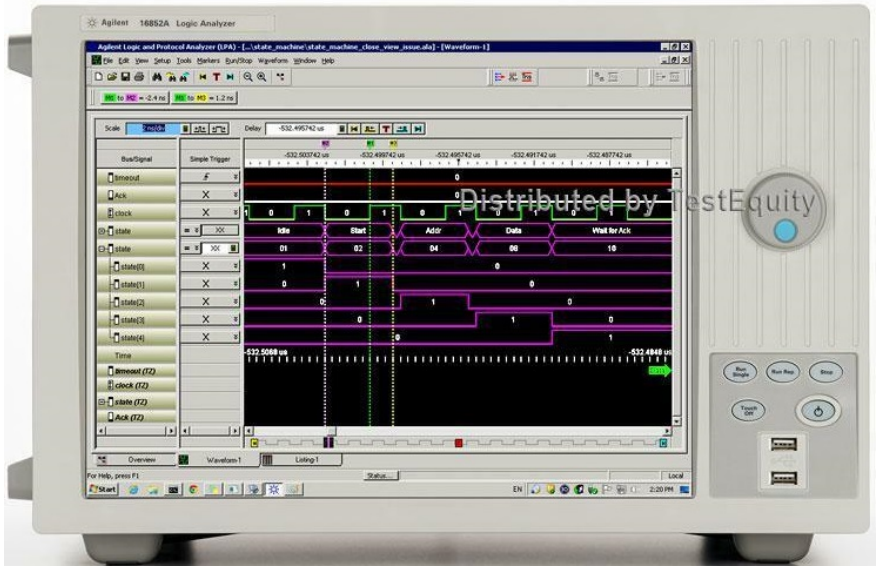
- Stable Low Current (10e-18) Measurements with PA
- Optimized for long cables or large chucks

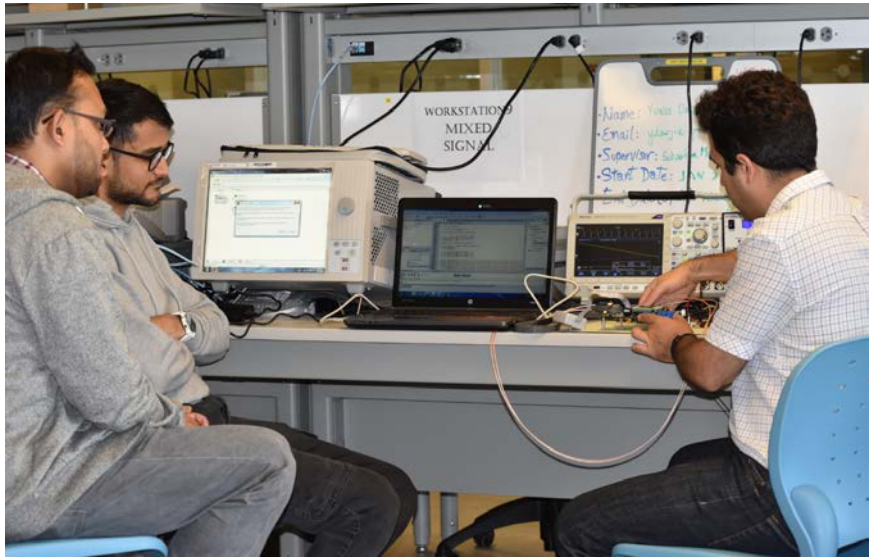
Workstation8: PNA-X Network Analyzer

WORKSTATION-8: Keysight N5241B PNA-X

- 13 GHz, 2 or 4 port measurement
- Replace an entire rack of equipments: Network analyzer, spectrum analyzer, two signal sources, noise figure analyzer, power meters, switch matrix, digital voltmeter
- Accurate and fastest common RF measurements in coaxial, fixtured, and on-wafer environments.
- Applications: S-parameters, noise figure, gain compression, harmonic distortion, X-parameter characterization, antenna test

Workstation9: Logic Analyzer

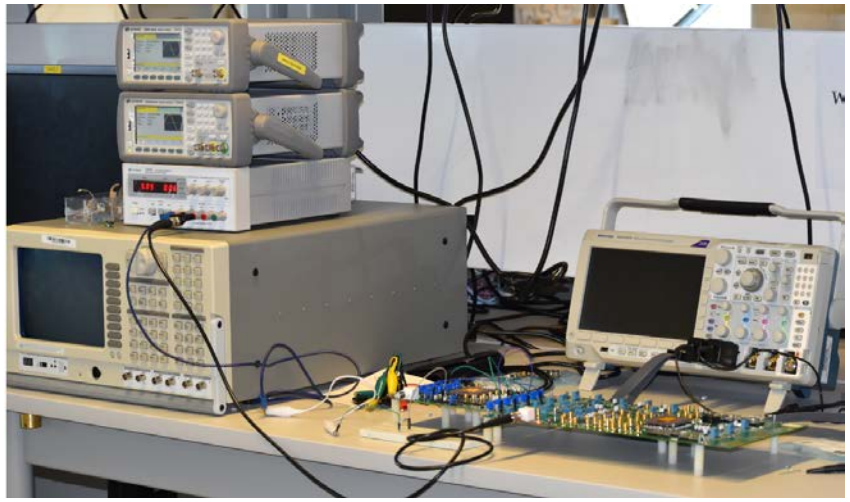




WORKSTATION-9: Agilent 16852A

- 13 GHz, 2 or 4 port measurement
- Replace an entire rack of equipments: Network analyzer, spectrum analyzer, two signal sources, noise figure analyzer, power meters, switch matrix, digital voltmeter
- Accurate and fastest common RF measurements in coaxial, fixtured, and on-wafer environments.
- Applications: S-parameters, noise figure, gain compression, harmonic distortion, X-parameter characterization, antenna test

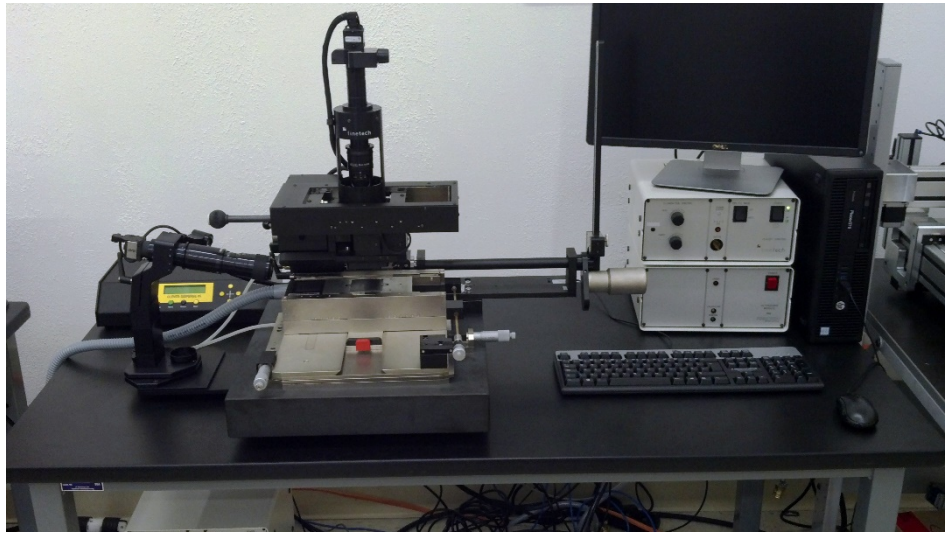
Workstation7: Spectrum Analyzer

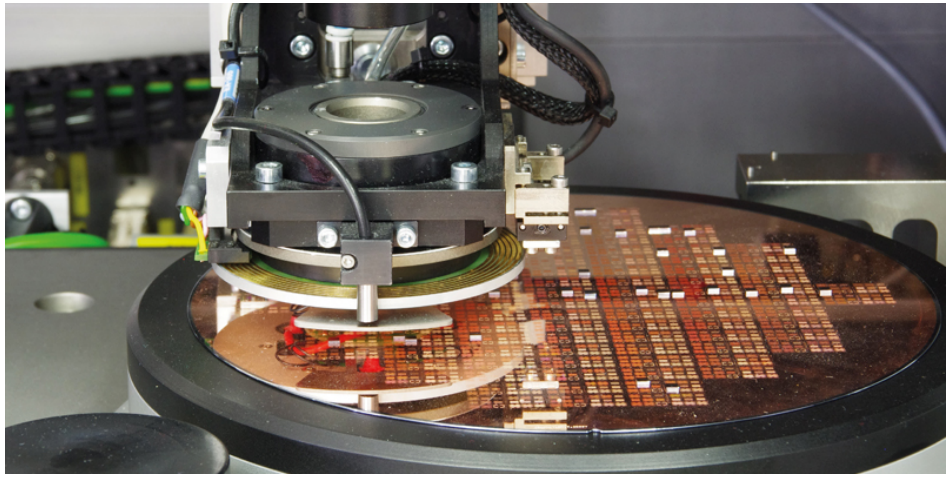


Analog Support Lab

- BRG 310E

Equipments in Analog Supply Lab (BRG310C)





FINEPLACER Lambda Die Bonder:

* Placement of fine pitch devices (e.g. Flip Chips and Flip Chip assemblies, optoelectronic components, MEMS, MOEMS, sensors, micro optics, surface mounted devices)
* 1µm accuracy
* Features: Synchronized control of all process parameters, e.g. force, temp., time, illumination, vision, process environment etc., compact design, small footprint and many more
* Process: Flip chip bonding, precision die bonding, IC stacking, chip on glass, chip on flex/film etc.
* Application: Laser diode assembly, micro optics assembly, MEMS, MOEMS, Image/gas pressure/acceleration-sensor assembly etc.

Rapid Prototyping Support (RPS) Lab

- BRG 310D

Equipments in Rapid Prototyping Support Lab (BRG310D)

Fumehood

- Local ventilation device that is designed to limit exposure to hazardous or toxic fumes, vapors or dusts.

Uses

- Protects the users from inhaling toxic gases
- Protects the product or experiment
- Protects the environment

Equipments in Rapid Prototyping Support Lab (BRG310D)

Faculty Members

- Amirali Amirsoleimani
- Amir M. Sodagar
- Ebrahim Ghafar-Zadeh
- Gerd Grau
- Hossein Kassiri
- Peter Lian
- Simone Pisana

Management

- Amin (BRG311)

Membership & Bookings

Lab Access Form

Membership Form

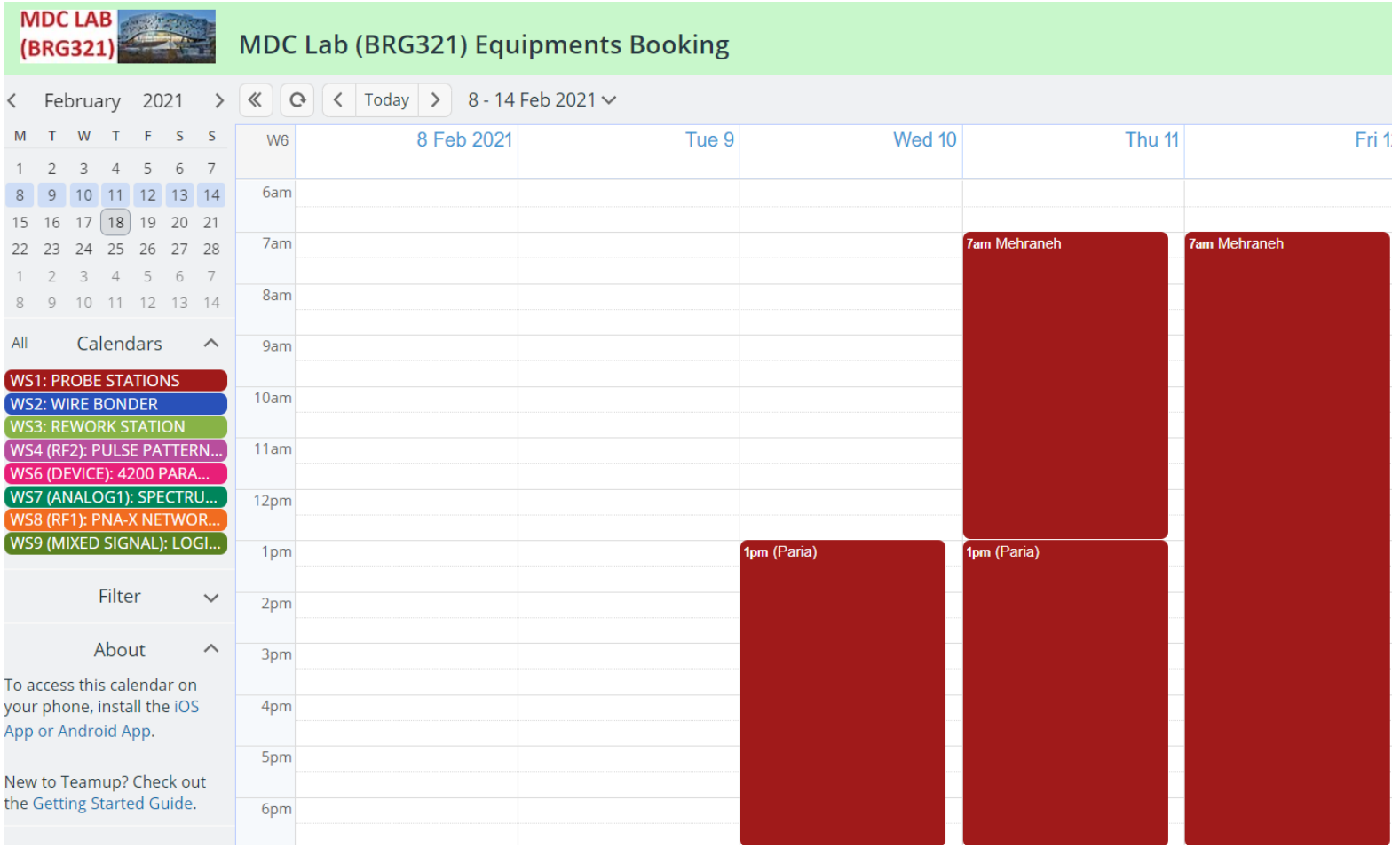
- Please fill out the following forms and return to the department with authorized signatures for getting access to the lab facilities.
- https://mpt.eecs.yorku.ca/membership-2/
- For COVID-19 situation, please submit online access request online.

Click Here to Book the Equipments

Lab Equipments Booking

- Please use our booking system to reserve the equipments in the lab.

Membership & Bookings



Softwares in MDC Lab

10 DUAL BOOT DESKTOPS, MOSTLY USED:

Altium Designer, Cadence Virtuoso, Matlab, Synopsis, C/C++, OrCAD Pspice, LTSpice, Solidworks, NI LabView

OTHER STATIONS WITH COMPUTERS IN MDC LAB:

4200 SCS parameter analyzer, PNA-X network analyzer, Wire bonder, die bonder, rework station, logic analyzer, pulse pattern analyzer, digital signal analyzer - all of these stations have in-house softwares came with the machine.

MDC Lab Safety Signs

NO FOOD OR DRINKS ALLOWED IN THE LAB

- Spillage can damage sensitive equipments
- If you have anything, please keep in your bag

MDC Lab Safety Signs

PLEASE KEEP QUITE IN THE LAB

- Grad students of almost 8 professors are in EECS department are working for research projects in this lab.
- Please keep quite and do not make any noise that can bother ongoing research projects

MDC Lab Safety Signs

DO NOT TOUCH – EXPERIMENT IN PROCESS

- Multiple research projects going on different workstations
- Do not touch other workstations
- If you need anything, ask the Technologist

Personal Safety

EMERGENCY STOP PUSH BUTTON

- Immediately halt equipment, machinery, or power delivery in response to an, unexpected hazard
- In case of any emergency, push the button immediately and report to the Technologist

Safety in the Lab

- Use the hand sanitizing station at the entrance
- You can get face mask from the supply room if you need.

House Keeping

First aid kit box in 310 corridor

Complementary services and Important Links

goSAFE services @ YorkU

- goSAFE will walk you anywhere on-campus
- Golf carts to help get you around campus as quickly and safely as possible
- Transportation Services: Shuttle Bus

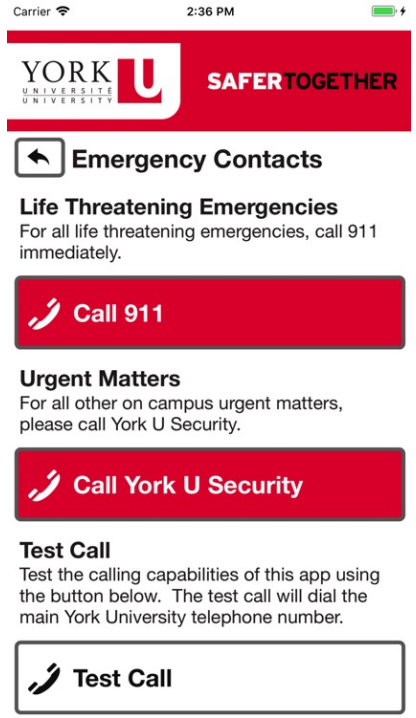
http://gosafe.info.yorku.ca/

York U Safety: app for students, faculty and staff.

Life Threatening **Emergency**: Call 911

York U **Emergency**: 4167365333 ext. 33333

York U **Non-Emergency**: 4166508000 ext. 58000




THANK YOU