Part D - NFF Equipment Reservation System Training

Mr. Wilson Yip
Purpose of Training

- To know how to reserve the equipment through equipment reservation system
- To know how to check in and check out the reserved equipment
- To know the rules and guidelines to reserve the equipment
- To know other features in the system
  - eg. Equipment training, lab material purchase, etc......

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Introduction of Equipment Reservation System

- NFF Equipment Reservation System direct URL
  - [https://nanolab.ust.hk/booking/navmain.asp](https://nanolab.ust.hk/booking/navmain.asp)

- OR click “User Login” through NFF homepage
Introduction of Equipment Reservation System

- Log in the system
  - Username
  - Password
  - Project No.

- You can get the above information after applying a NFF account

Any query, please email to binoman@ust.hk or call Norman LAW at Ex.8021
Introduction of Equipment Reservation System

- Log out: To log out your NFF account
- Reservation: To book equipment of NFF
- Check In/Out: To check in and check out equipment before and after operation
- User Info: Include lab material purchase, equipment operation training, etc……
- View Lab Notice: To notify equipment or lab shutdown
- View Eq Reservation: To show reservation status in NFF
- Available Reservation Hours: Hours that you remain for reservation.
  - Each NFF account has maximum of 20 hours to make reservation

<table>
<thead>
<tr>
<th>Project No: MFF000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Ho Li</td>
</tr>
<tr>
<td>Ho Li</td>
</tr>
<tr>
<td>Ho Li</td>
</tr>
</tbody>
</table>
■ More about “View Eq Reservation”…….
  ■ It is to show the reservation status of each equipment
    ■ Separate into four modules
    ■ Show who reserve the equipment with time slot
    ■ Purple color: User has checked in the equipment and is operating the equipment now.
    ■ Black color: User has reserved the equipment with corresponding time slot

<table>
<thead>
<tr>
<th>Name</th>
<th>Project No.</th>
<th>Date</th>
<th>Time</th>
<th>Job</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zhenhuan TIAN</td>
<td>NFF1125</td>
<td>8/21/2015</td>
<td>09:00 - 18:00</td>
<td>500A TiW/1um Cu / Copper (Cu), Tungsten-Ti (W/Ti)</td>
</tr>
<tr>
<td>Zhen SUN</td>
<td>MFF919</td>
<td>8/24/2015</td>
<td>09:00 - 18:00</td>
<td>Cr 500A Au 1500A / Chromium (Cr), Gold (Au)</td>
</tr>
<tr>
<td>Daniel Josephus</td>
<td>MFF901</td>
<td>8/25/2015</td>
<td>09:00 - 18:00</td>
<td>50/500 / Chromium (Cr), Platinum (Pt)</td>
</tr>
<tr>
<td>VILLAROMAN</td>
<td>MFF911</td>
<td>8/26/2015</td>
<td>09:00 - 18:00</td>
<td>Gold / Chromium (Cr), Gold (Au)</td>
</tr>
<tr>
<td>Daniel Josephus</td>
<td>MFF991</td>
<td>8/27/2015</td>
<td>09:00 - 18:00</td>
<td>50/500 / Chromium (Cr), Platinum (Pt)</td>
</tr>
<tr>
<td>VILLAROMAN</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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More about “View Lab Notice”…….

- A notice for you to know the equipment status, mainly for notification of equipment shutdown

### For example

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Type of shut down</th>
<th>Shut down period</th>
<th>When can you reserve?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxford ALD</td>
<td>Scheduled shut down (eg. Routine maintenance)</td>
<td>2/15/2017 – 2/17/2017</td>
<td>CAN reserve any time slots EXCEPT the time slots during shutdown period</td>
</tr>
<tr>
<td>DRIE Etcher #1</td>
<td>Non-scheduled shut down (eg. Pump failure)</td>
<td>From 2/15/2017 until further notice</td>
<td>CANNOT reserve any time slots starting from 2/15/2017 until further notice</td>
</tr>
</tbody>
</table>

- System will not allow you to book the equipment during shutdown
More about “View Lab Notice”……

- How about if you have already reserved an equipment but a shut down notice is issued afterward?
  - Delete your affected reservations automatically by system
  - Return reservation hours
  - Send a notification email to you to inform you that your reservations have been cancelled

- Always keep checking NFF lab notice to know the equipment status and to well prepare for your process.
Introduction of Equipment Reservation System

More about “User Info”……..

- You can change your account password anytime
- You can purchase some NFF materials (e.g. Wafers, tweezer, etc……) through the system
- You can check your account’s monthly charging record (only for HKUST members)
- You can join equipment operating training in order to learn how to operate the equipment by yourself
- You can find the equipment operating manual or training video
- You can apply for using software tools
  - LinkCAD and DeScribe
- Other information related to NFF (e.g. NFF user meeting notice, handbook)
Equipment Reservation

- Types of equipment that need to be reserved (Only show part of them below. For a full list, please click HERE):

<table>
<thead>
<tr>
<th>Thermal Diffusion and Implantation Module</th>
<th>Photolithography Module</th>
<th>Dry Etching and Sputtering Module</th>
</tr>
</thead>
<tbody>
<tr>
<td>CF-3000 Implanter (1hr/session)</td>
<td>ASML Stepper (1hr/session)</td>
<td>DRIE Etcher #1 (1hr/session) And (3hrs/session)</td>
</tr>
<tr>
<td>Oxford ALD (3hrs/session)</td>
<td>Karl Suss MA6 #1 and #2 (1hr/session)</td>
<td>Lam 490 Etcher (1hr/session)</td>
</tr>
<tr>
<td>TEOS PECVD (3hrs/session)</td>
<td>AB-M Aligner #1 and #2 (1hr/session)</td>
<td>Cooke Evaporator #1 and #2 (3hrs/session)</td>
</tr>
<tr>
<td>AG610 RTP (1hr/session)</td>
<td>Karl Suss Bonder SB6 (3hrs/session)</td>
<td>CVC-601 Sputter (9hrs/session)</td>
</tr>
</tbody>
</table>

- Each equipment has its own “hours per session”

- Equipment that do not need to be reserved (First-come, first-served):
  - Ovens, hot plates, spin coaters, wet stations
  - Microscopes
  - Surface profiler, probe station, resistivity measurement system
Equipment Reservation

- Equipment can be reserved 2 weeks in advance
- How to reserve an equipment?
  - Step 1
    - Log in the system, go to “Reservation” and click “Make/Delete Reservation”
  - Step 2
    - Select the module and equipment that you want to reserve in the module
    - Eg. Trion RIE Etcher in Dry Etching and Sputtering Module
    - Click “OK” if there is a pop-up message which reminds you some information before reserving the equipment
How to reserve an equipment?

- **Step 3**
  - Put a tick in the box. Each box represents a time slot. The box without a user name on it means this time slot is available. Don’t put a tick in the box that has a name on it. It means that time slot has been reserved already!

- **Step 4**
  - Select “Make Reservation” and fill in the information. Click “Submit Form” after checking the box of “I’m not a robot”.

For deposition process, you need to select what materials you deposit.
Equipment Reservation

- How to reserve an equipment?
  - Step 5
    - If you can reverse the equipment successfully, you will receive an email to confirm your reservation. Otherwise, you have to go back and reserve again.

- Delete reservation
  - You can delete reservation through the system at least one day in advance.
  - Put a tick in the box that you have selected, choose “Delete Reservation” and then click “Submit Form”
  - You will receive an email to confirm your deletion of reservation.
  - If you reserve a time slot but you do not come over or delete the reservation, HK$200 will be charged as penalty.
  - For urgent case, you can contact IT staff for help of deleting reservation.
Equipment Reservation

- **Special arrangement for DRIE Etcher #1 reservation**
  - To well utilize the equipment and shorten the queue
    - **For Time slot of every Tuesday, Wednesday and Friday**
      - Can be reserved ONLY by a computer in CYT Room 3006
      - 3 hours per session (totally 5 sessions per day)
      - For long process
    - **For Time slot of every Monday and Thursday**
      - First come, first served. Can be reserved ONLY by a computer in NFF PII
      - 1 hour per session (totally 15 sessions per day)
      - For short process
      - You can only reserve “current session” (eg. 9am-10am). If “current session” is just reserved by another user, you still can reserve “next session” (eg. 10am-11am).
Equipment Reservation

Things you need to know……
- Each NFF account has maximum of **20 hours** for equipment reservation
- The deduction of hours is based on “hours per session” of the equipment you reserved
  - For example, after you reserved three equipment, you only have 14 hours left

<table>
<thead>
<tr>
<th>Reserved Equipment</th>
<th>Time Slot</th>
<th>Hours per session</th>
<th>Remaining hours (20hrs as start)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxford ALD</td>
<td>9am-12pm</td>
<td>3</td>
<td>20-3 = 17</td>
</tr>
<tr>
<td>AST Metal Etcher</td>
<td>11am-1pm</td>
<td>2</td>
<td>17-2 = 15</td>
</tr>
<tr>
<td>AG610 RTP</td>
<td>3pm-4pm</td>
<td>1</td>
<td>15-1 = 14</td>
</tr>
</tbody>
</table>

- Hours will be returned when you check out the equipment after operation
- Special case for CVC-601 Sputter and ARC-12M Sputter
  - 6 hours per session but only deduct 3 hours due to long time of chamber pump down
Equipment Check-In / Check-Out

- Equipment check-in – Do it **BEFORE** operating the equipment
- Equipment check-out – Do it **AFTER** operating the equipment
- Two ways to check in and check out the equipment
  - Through NFF reservation system on web site
    - Only computers in labs can do check-in and check-out
  - Through NFF access card
    - Each user needs to get a NFF access card for lab access and equipment check-in and check-out
To check in and check out through the website:

- **Step 1**
  - Log in to the system, go to "Check In/Out" and click "Check In" or "Check Out".

- **Step 2**
  - Put a tick in the box that you want to check in or check out. Then click "Submit Form".

### Machine(s) to be Checked In

<table>
<thead>
<tr>
<th>Machine Name</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cello GaN Etching</td>
<td>Wednesday, Jan 14, 2015</td>
<td>16:00 - 17:00</td>
</tr>
<tr>
<td>Cello GaN Etching</td>
<td>Wednesday, Jan 14, 2015</td>
<td>17:00 - 18:00</td>
</tr>
</tbody>
</table>

- If you check in successfully, the reservation status will be changed to purple and the equipment will be unlocked for operation.

### Project Information

<table>
<thead>
<tr>
<th>Name</th>
<th>Project No.</th>
<th>Date</th>
<th>Time</th>
<th>Job</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pui Keung YIP</td>
<td>MFF000</td>
<td>1/14/2015</td>
<td>16:00 - 17:00</td>
<td>test</td>
</tr>
<tr>
<td>Pui Keung YIP</td>
<td>MFF000</td>
<td>1/14/2015</td>
<td>17:00 - 18:00</td>
<td>test</td>
</tr>
</tbody>
</table>
To check in and check out through NFF access card (For reserved equipment)

- Within your reserved time slots, put your card on card reader that is mounted on the equipment.
- If you can check in or check out successfully, a LED will be turned on or turned off accordingly. Otherwise, 3 times of “beep” sound will come out as a failure sound.
- Check in: LED turns on and equipment will be unlocked for operation.
- Check out: LED turns off and equipment will be locked.

![LED turns on](image1)

![Green LED turns on](image2)

- The 1st generation card reader
- The 2nd generation card reader (LED is embedded)
To check in and check out through NFF access card (For “non-reserved” equipment)

- There are equipment that do not need reservation but they are mounted with card readers
  - Surface profiler, PR spin coater, wet stations, etc……
- They are “first come first serve basis”
- Use your NFF access card to check in and unlock the equipment to operate
- Remember to check out after use (except the 3rd generation card reader)

The 1st generation card reader

The 2nd generation card reader (LED is embedded)

The 3rd generation card reader with timer and display embedded. Once check in, timer will start to count down and equipment will be unlocked for operation.
Equipment Check-In / Check-Out

Rules of Check-In

- If you don’t use your OWN NFF access card to enter NFF labs, you will fail to go into check-in web page or you will fail to check in through the card.

- If you come late (i.e. late more than half of your reversed time slot), you cannot check in the equipment on web site. It means there is time limitation.
  - Example:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Reserved Time slots</th>
<th>The time you come to check in</th>
<th>Check in successfully?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxford ALD</td>
<td>12am – 3pm</td>
<td>2pm</td>
<td>No</td>
</tr>
<tr>
<td>Trion RIE Etcher</td>
<td>9am – 10am</td>
<td>9:35am</td>
<td>No</td>
</tr>
</tbody>
</table>

- In this case, other NFF users can reserve your time slot.
Equipment Check-In / Check-Out

Rules of Check-In

- If you reserve a consecutive time slot, you can check in all of them at the same time by NFF access card or web site

- System will not check in the equipment for you. You have to do it by yourself whenever you have a new reservation

- If you reserve an equipment but do not come into lab to check in, you will be charged HK$200 as penalty
  - You will receive an email for the notification of penalty in the second day
Rules of Check-Out

- If you have checked in a consecutive time slot, you can check out all of them at the same time by NFF access card or web site.

- What if you forget to check out the equipment?
  - For photolithography equipment
    - If you forget to check out, the system will calculate the usage time from your check in time to next user’s check in time. If you are the last user of that equipment in that day, the system will charge you from your check-in time to the lab closing time (i.e. 11:59pm for all NFF labs).
  - Example

<table>
<thead>
<tr>
<th>User</th>
<th>Reserved time slot</th>
<th>Check-in time</th>
<th>Check-out time</th>
</tr>
</thead>
<tbody>
<tr>
<td>User A</td>
<td>10am-11am</td>
<td>10:05am</td>
<td>11:15am</td>
</tr>
<tr>
<td>User B</td>
<td>11am-12pm</td>
<td>11:15am</td>
<td></td>
</tr>
</tbody>
</table>

- You will receive an email to notify you in the second day.
  - For other equipment
    - The system will automatically check out your equipment at the end of your reserved time slot.
    - For example, your reserved time slot is 9am-12pm and the system will count 12pm as your check out time.
How to purchase NFF materials?

- **Step 1**
  - Log in the system, go to “User Info” and click “Material Request”

- **Step 2**
  - Click “Lab Material”
  - Check what materials you want to purchase and input a quantity on it
  - Click “Submit”
How to purchase NFF materials?

- **Step 3**
  - After submission, print the Request Form and let your budget controller to sign on it
  - Submit the signed form to NFF staff to get the materials

You can review you material submission by clicking “View Request”
Training For Equipment Operation

- Let you know how to operate equipment by yourself
  - Karl Suss MA6 #1 and #2, AST 600EI Evaporator, etc......
- It is **NOT ALLOWED** to operate the listed equipment without joining our training
- You don’t have to join training of all equipment, just choose which you need to learn and operate (refer to your process flow)
- Go to “Equipment Operation Training” in “User Info” to register for training
  - Go through equipment’s operation manual and training video (if provided)
  - Register for training of the equipment that you want to operate
  - After training and ability confirmation test, you can get the right to operate the equipment by yourself
- If you don’t operate the equipment for more than 6 months, you need to be re-qualified
You can check what equipment you have been qualified to operate

Click to know qualified list

The following equipment (in the table shown below) have been released for hand-on operation training. If users do not find his/her name on the qualified list (Or click here for knowing what equipment you have been qualified) and plan to operate those equipment by themselves for their projects frequently (more than 1 time per month) in the near future, please follow these procedures:

1. Go through equipment’s operation manual on NFF web-site.
2. When getting familiar with such operation steps, please apply the hand-on training by sending request to NFF.
3. After attending the training and passing the ability confirmation test, user can get the right to operate those equipment by themselves.

### Available Equipment For Training:

<table>
<thead>
<tr>
<th>Thermal Process and Implantation Module</th>
<th>Photolithography Module</th>
<th>Wet Etching and CMP Module</th>
<th>Dry Etching and Sputtering Module</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration</td>
<td>Registration</td>
<td>Registration</td>
<td>Registration</td>
</tr>
<tr>
<td>1. STS Multiplex</td>
<td>1. Karl Susa MA6</td>
<td>1. PEF Wet Station II (Phase III)</td>
<td>1. AST C200 Al Metal Etcher</td>
</tr>
<tr>
<td>PECVD, PECV02</td>
<td>Aligner, both #1 and #2</td>
<td></td>
<td>Registration</td>
</tr>
<tr>
<td>2. Alivion 21 AWE10 RTP (Phase III)</td>
<td>2. Solitec 5110-C/PD Manual Photoresist Coater (Phase III)</td>
<td></td>
<td>Registration</td>
</tr>
<tr>
<td>Registration</td>
<td>Registration</td>
<td>3. EVG 101 Spray Coater</td>
<td>Registration</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. Oxford PlasmaLab 10 Plus PEL (Phase III)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4. AST 4500 E-beam Evaporator (Phase III)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5. Branson IPC 3600 O2 Asher (Phase III)</td>
</tr>
</tbody>
</table>

Remark: The exact date and venue of training will be informed to you by E-mail after registration.
Lab Operating Hours

- **NFF-Phase II**
  - Room 2230 (near lift no.23)
  - 9am-midnight (Monday – Friday, closed on Saturday, Sunday and public holiday)

- **NFF-Enterprise Center**
  - Room 4162 (near lift no.33)
  - 24hours (Monday – Friday, closed on Saturday, Sunday and public holiday)

- **NFF-TSV Process Laboratory**
  - Room 2227 (near lift no.23)
  - 9am-midnight (Monday – Friday, closed on Saturday, Sunday and public holiday)

- **NFF-Deep RIE Process Center**
  - Room 2223 (near lift no.23)
  - 9am-5pm (Monday – Friday, closed on Saturday, Sunday and public holiday)
Lab Operating Hours

- **Office hour of NFF**
  - 8:45am – 5:33pm (Monday – Friday)
  - For non-office hour, please follow **buddy system** to work in NFF lab
  - **DON’T stay and work ALONE** in NFF lab
Green User Policy

- Objectives
  - Encourage more practices for “green” users
  - Avoid serious operational mistakes

- Who are “green” users?
  - Without experiences in working in the NFF cleanrooms
  - Have not been using the NFF cleanrooms for 1 year or more
  - UG students (“green” user throughout the whole period working in the NFF)
Green User Policy

- Dos and Don’ts for “green” users
  - Lab access time: 9:00-17:00
  - Must consult the NFF staff before starting a process
  - “Green” users are not allowed to start any wet processes, prepare or dispose any chemicals without monitoring by the NFF staff (or by another regular NFF user within the same research group who has been a regular user for at least 6 months, if the regular user is willing to take the responsibility).
Green User Policy

- Criteria for promotion to become the regular user
  - 3-month probation since the project start date
  - Accumulated total working hours of at least 50 hours in the NFF labs
  - No warning letters
  - No recommendations by NFF staff to extend the probation period

Accumulated working hours (update once per day)

Project start date

Nanostystem Fabrication Facility, The Hong Kong University of Science and Technology
Thanks for your coming!

(Part D will not be included in the exam)