

CNST NanoFab

NEMO User Manual

The screenshot displays the NEMO user interface. At the top, a navigation bar includes 'NEMO', 'Calendar', 'Status dashboard', and 'Administration'. On the right, it shows 'Welcome, Jerry' with a settings gear icon and a 'Logout' link.

The main content area is divided into three sections:

- Upcoming reservations:** Two yellow boxes. The first states: 'You're late for your A115 reservation! Starting on Wednesday, July 1st @ 3:00 PM Ending on Wednesday, July 1st @ 6:00 PM'. The second states: 'You're late for your Cleanroom reservation! Starting on Wednesday, July 1st @ 3:00 PM Ending on Wednesday, July 1st @ 7:00 PM'.
- Alerts & outages:** A pink box stating: 'Phase One will initiate on July 6th 2020 Limited personnel only'.
- Current NanoFab usage:** A blue box stating: 'You are logged in to the G107. Usage time is being billed to the project named Base Project.'

Below these sections are five interactive icons with labels:

- Calendar:** A calendar icon showing the number 12.
- Status Dashboard:** A blue circular icon with a white lowercase 'i'.
- Safety suggestions:** A red first aid kit icon with 'NanoFab' and a white cross.
- Send feedback:** A blue speech bubble icon.
- News and events:** A newspaper icon with 'NEWS' written on it.

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Using NEMO to access the CNST NanoFab labs and tools

Log in to NEMO

- NEMO is accessible on or off campus at nemo.nist.gov.
 - Login through a NIST computer is automatic, no username or password is required.
 - Login off campus or through a personal device will require you to input your username and password.
- The NEMO landing page below is used to navigate the NEMO website and provides important information.

The screenshot shows the NEMO dashboard interface. At the top, there is a navigation bar with the following elements: 'NEMO', 'Calendar', 'Status dashboard', 'Administration' (with a dropdown arrow), a '1' in a black box, 'Welcome, Jerry', a gear icon, and 'Logout'. Below the navigation bar, there are three main content areas, each with a numbered callout: 1. 'Upcoming reservations' (callout '2') with two yellow boxes: 'You're late for your A115 reservation! Starting on Wednesday, July 1st @ 3:00 PM Ending on Wednesday, July 1st @ 8:00 PM' and 'You're late for your Cleanroom reservation! Starting on Wednesday, July 1st @ 3:00 PM Ending on Wednesday, July 1st @ 7:00 PM'. 2. 'Alerts & outages' (callout '3') with a red box: 'Phase One will initiate on July 6th 2020 Limited personnel only'. 3. 'Current NanoFab usage' (callout '4') with a blue box: 'You are logged in to the G107. Usage time is being billed to the project named Base Project.' Below these areas are four icons with labels: 'Calendar' (calendar icon), 'Status Dashboard' (info icon), 'Safety suggestions' (red first aid kit icon), and 'Send feedback' (speech bubble icon). At the bottom left is a 'News and events' section with a newspaper icon. At the bottom center, the version number 'v 3.0.0' is displayed.

1. NEMO navigation bar provides easy access on every NEMO page. Click NEMO to return to the landing page.
2. All upcoming reservations are displayed.
3. All alerts and outages are displayed.
4. All current area and tool usage are displayed.

Make a reservation in the area you plan to use.

Area reservations are only required in the Cleanroom and Soft Lithography labs.

The screenshot shows the NEMO reservation system interface. The navigation bar at the top includes 'NEMO', 'Calendar' (highlighted with a red box and a yellow '1'), 'Tool control', 'Status dashboard', and 'Administration'. Below the navigation bar, there are buttons for 'Reservations', 'Today', 'Reserve for someone else', and 'Schedule an outage'. A search bar is present with the text 'Search for a tool or an area'. The 'Personal schedule' section shows 'Areas' with 'Cleanroom - 7 / 12' (highlighted with a red box and a yellow '2') and 'Soft lithography 0 / 2'. Below this are 'Tools' including 'Chemical Vapor Deposition' (Atomic Layer Deposition, PECVD) and 'Dry Etch' (790 RIE Middle, 790 RIE Nitride Left). The main calendar view shows a grid for the week of 11/16 to 11/22. A reservation for 'Robert Ilic (br)' is shown on Tuesday, 11/17, from 3:00 to 5:00 (highlighted with a red box and a yellow '3').

1. Select “Calendar” from the navigation bar.
2. Select the area to make a reservation in.
 - a. The icon next to the area name indicates the occupancy status (green is good, red is at or above the occupancy limit).
 - b. The number of users in the area and the occupancy limit are indicated next to the status icon (e.g. 0 / 10).
3. On the calendar, click the start time and drag to the end time.
 - a. If the maximum number of slots is already reserved, you will receive an error.

The screenshot shows a dialog box titled "NanoFab policy conflict" with a close button (X) in the top right corner. The main text reads: "This reservation conflicts with NanoFab policy." Below this is a bulleted list: "• The Cleanroom is already at its maximum capacity at this time. Please choose a different time." At the bottom right of the dialog box is an orange "Continue" button.

Note:

- Reservations can be reviewed and/or canceled by clicking the reservation then clicking the cancel button.

Cleanroom reservation details ✕

Title	Robert Ilic (bri)	Set title
-------	-------------------	-----------

User: Robert Ilic (bri)
Created by: Robert Ilic (bri)
Created on: Thursday, November 5th, 2020 @ 10:41 AM
Area: Cleanroom
Start: Tuesday, November 17th, 2020 @ 3:00 PM
End: Tuesday, November 17th, 2020 @ 5:00 PM
Identifier: 574762

Cancel this reservation

- Reservations can be moved by dragging the reservation to another time.
- Reservations can be resized by clicking the resize bar on the bottom of the reservation box.

Restrictions:

- You will not be able to enter the lab without an area reservation.
- You will not be able to make tool reservations without an area reservation.
- Reservation rules will be implemented to maximize the availability of the labs to the researchers and may change with demand for the lab.
- You must leave the lab before the reservation end time to allow others to enter.

Make tool reservations

The screenshot displays the NEMO reservation system interface. The navigation bar at the top includes 'NEMO', 'Calendar' (highlighted with a red box and a yellow '1'), 'Tool control', 'Status dashboard', and 'Administration'. Below the navigation bar, there are buttons for 'Reservation', 'Today', 'Reserve for someone else', and 'Schedule an outage', along with view options for 'Day', 'Week', and 'Month'. The main calendar grid shows a reservation for '3:00 - 5:00 Robert Ilic (br)' on Tuesday, 11/17, highlighted with a red box and a yellow '3'. On the left sidebar, the 'Tools' section is expanded, with 'PECVD' highlighted by a red box and a yellow '2'. Other tools listed include 'Chemical Vapor Deposition', 'Atomic Layer Deposition', 'Dry Etch', and three '790 RIE' variants.

1. Select "Calendar" from the navigation bar.
2. Select the tool to make a reservation on.
3. On the calendar, click the start time and drag to the end time.

Note:

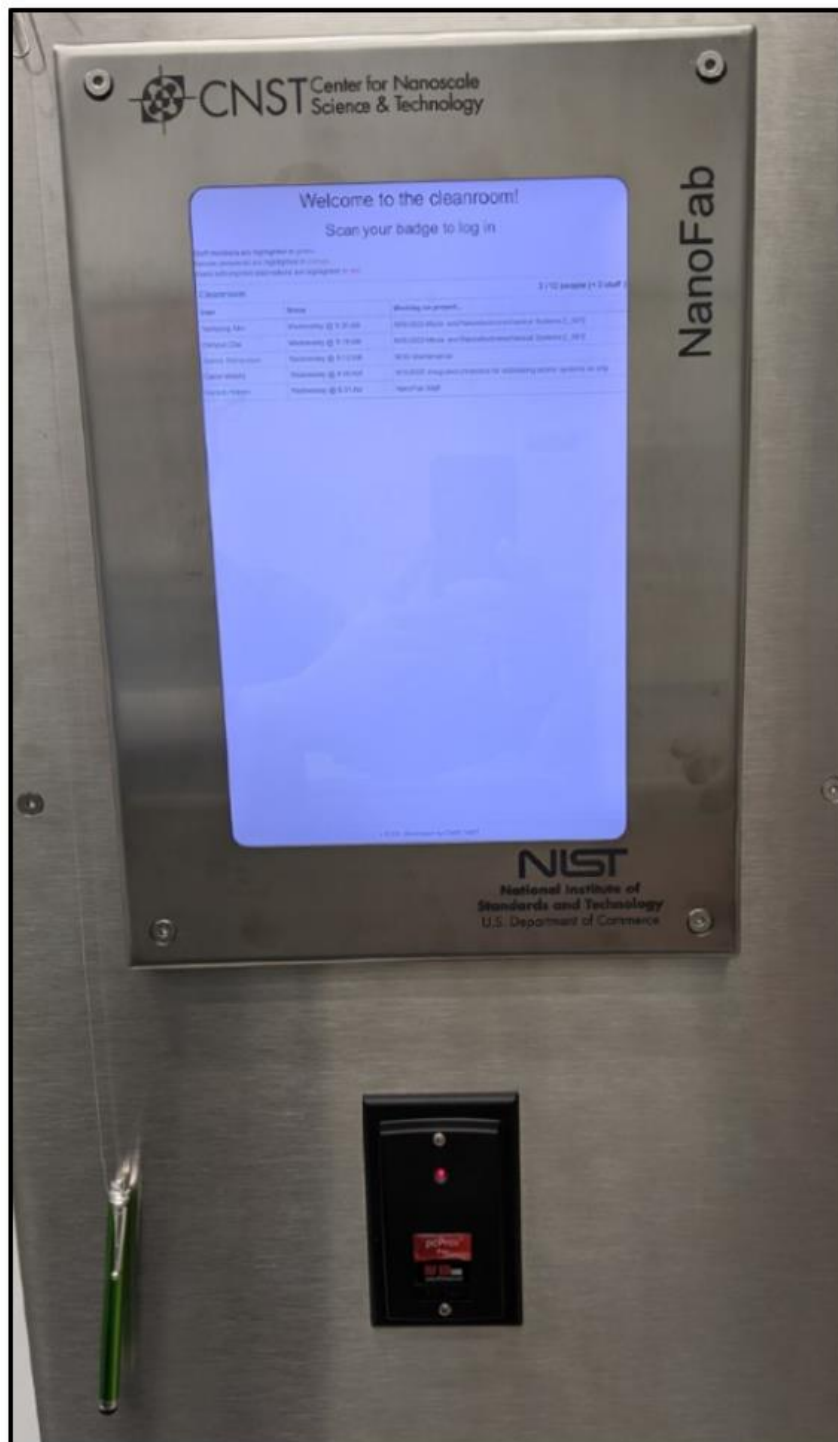
- Reservations can be canceled by clicking the reservation then clicking cancel.
- Reservations can be moved by dragging the reservation.
- Reservations can be resized by clicking the resize bar on the bottom of the reservation box.

Restrictions:

- Tool reservations in the Cleanroom and Soft Lithography labs require an area reservation prior to making tool reservations and the tool reservation start time must be within your area reservation time window.

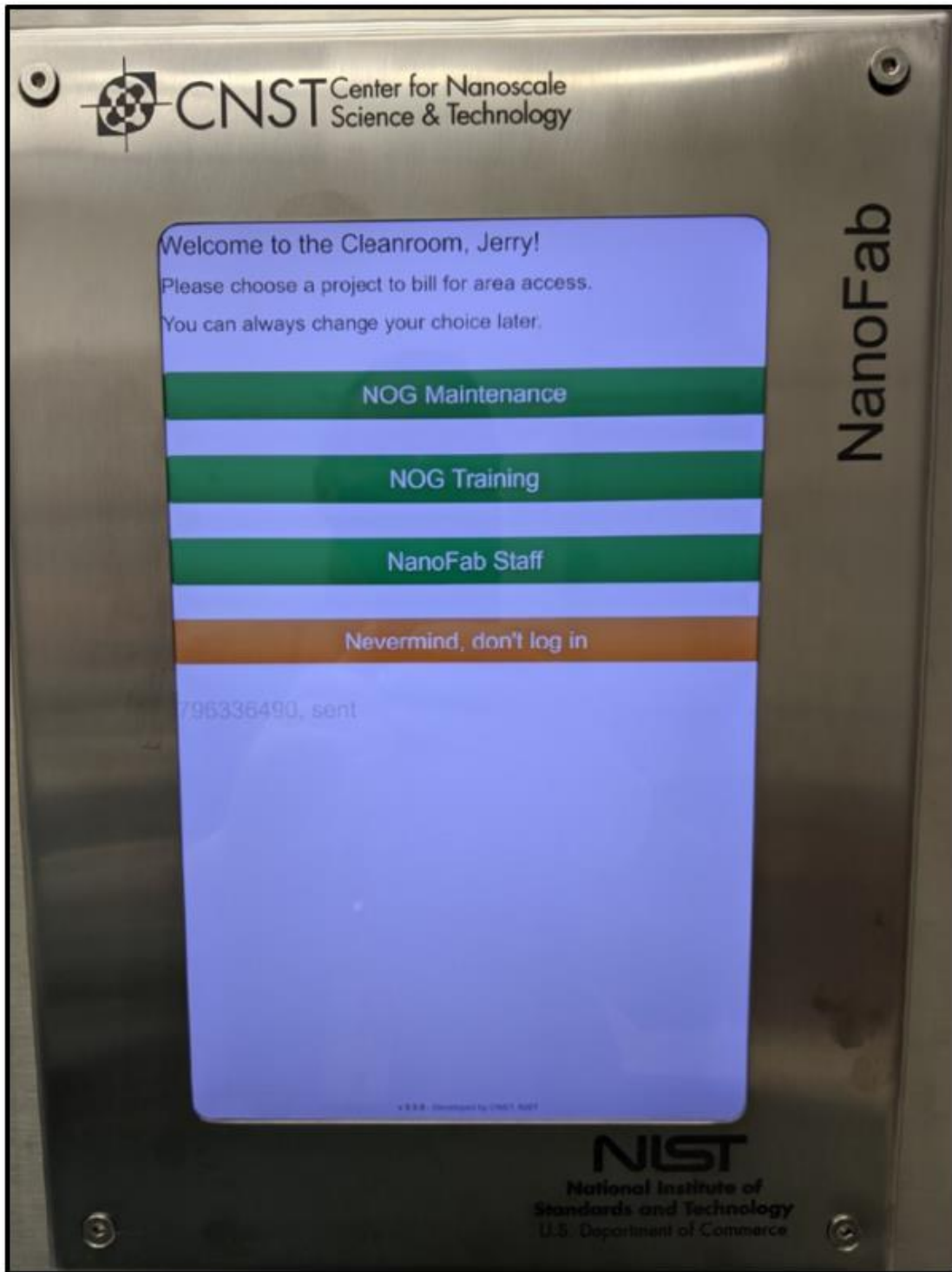
Log into the lab.

Cleanroom and Soft Lithography labs only.



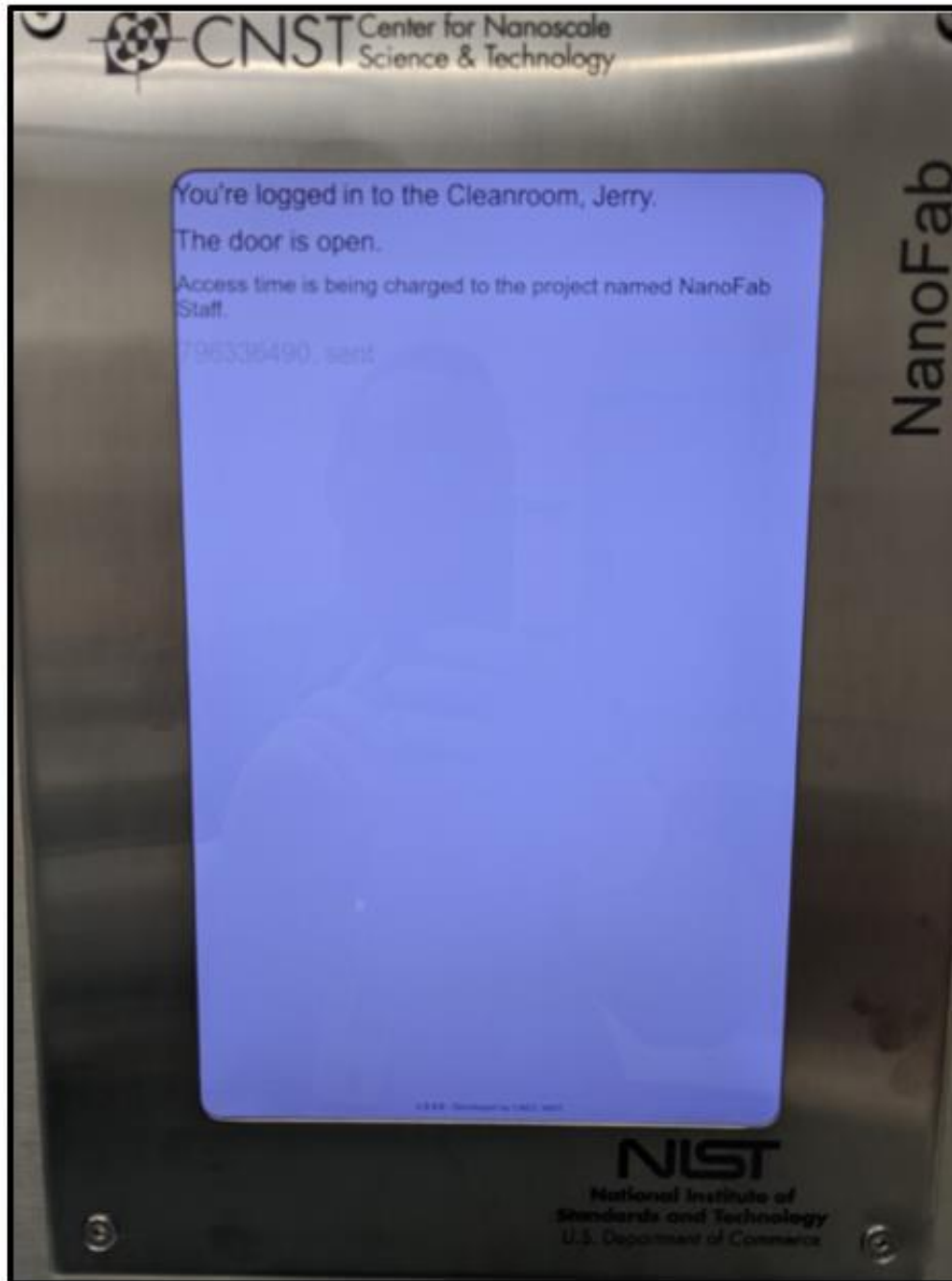
Cleanroom entrance tablet

1. Scan you badge at the entrance tablet to enter the lab.



Select project

2. If you have multiple projects, select the project to use using the stylus.



Door open message

3. The door will unlock for five seconds allowing entry.

Restrictions

- The entrance tablet will only allow access to the lab if the occupancy is below the limit and you have a reservation.
- If you are more than 30 minutes late for your area reservation it will automatically be canceled.

Be aware of room occupancy limits in all labs and NanoFab spaces

- Occupancy limit signs are posted in each area. Do not enter if area is at capacity.
- Always maintain 6 feet of social distance between yourself and others.
- If you need to access an area that is at capacity or you can't get to your work area without maintaining social distancing, ask one of the people in the area to step out of the area.

Enable and use any tools required.

1. Select "Tool control" from the navigation bar.
2. Click on the tool to be enabled.
3. If you have multiple projects, select the project to use.
4. Click the start button.
5. If you have any problems, report the issues in NEMO on the Tool control page, Report a problem tab.

Disable tools when finished.

The screenshot shows the NEMO Tool Control interface. The navigation bar at the top includes 'NEMO', 'Calendar', 'Tool control' (highlighted with a red box and a '1' in a black box), 'Status dashboard', and 'Administration'. The left sidebar lists various tool categories: 'Chemical Vapor Deposition' (with 'Atomic Layer Deposition' and 'PECVD' highlighted by a red box and a '2' in a black box), 'Dry Etch', 'Focused Ion Beams', 'Furnaces', 'Imaging and Analysis', and 'Lithography' (with sub-items like 'ASML Design Station', 'ASML Stepper', 'DUV Resist Stabilizer', 'HMDS Prime', 'Hotplate 1', 'Hotplate 2', 'JEOL E-beam', 'JEOL E-beam Cleanroom', 'Laser Mask Writer', 'MLA 150', 'Nano-imprinter', 'Nitrogen Oven', 'Suss Resist Coater', and 'Suss Resist Developer'). The main content area is titled 'PECVD' and includes a 'Summary' tab, 'Details', 'Report a problem', and 'Post a comment' options. A message states: 'You are using this tool for the project named NOG Maintenance since Thursday @ 11:14 AM.' Below this, tool rates and training rates are listed. A list of user comments is visible. At the bottom, there is a control panel with a red box around the text 'Prevent others from using the tool for 15 minutes after disabling the tool. What's this?' (with a '3' in a black box) and a 'Stop using the PECVD' button (with a '4' in a black box).

1. Select “Tool control” from the navigation bar.
2. Click on the tool to be enabled.
3. Answer post-usage questions (most tools don’t have post-usage questions).
4. Click the stop button.

Report any tool issues encountered.

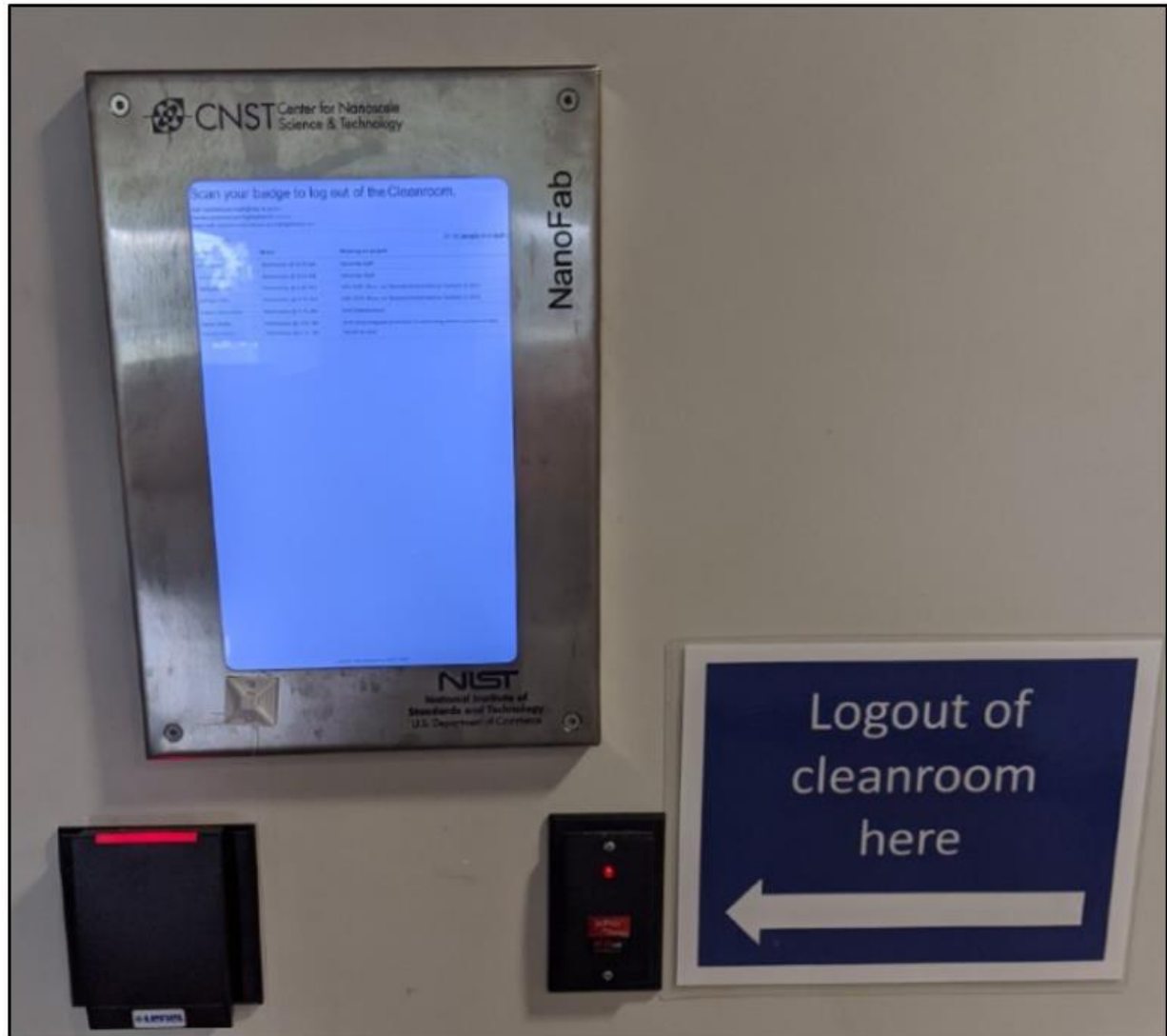
If you encounter trouble with a tool, report it in NEMO. Staff are automatically alerted by email when a problem or shutdown is reported.

The screenshot shows the 'Report a problem' form for a tool named 'PECVD'. The form has several sections: a navigation bar with 'Summary', 'Details', and 'Report a problem' (highlighted with a red box and callout 1); a text area for the problem description (highlighted with a red box and callout 3); a dropdown menu for problem categories (highlighted with a red box and callout 2); a section with two checkboxes for safety hazards and tool shutdown (highlighted with a red box and callout 4); a 'Choose Files' dialog box (highlighted with a red box and callout 5); and a 'Report problem' button (highlighted with a red box and callout 6).

1. From the tool page of interest, select the Report a problem tab.
2. Select a category from the dropdown list that best describes the type of problem. If there is no appropriate category then leave the field blank.
3. Provide details of the issue encountered. Provide all relevant information to help the staff determine how the tool was being used, what was going on immediately before the issue occurred, what happened, and any observations following the issue.
4. If the issue a safety issue check the safety hazard checkbox. If the issue will prevent the tool from being used by others check the shutdown checkbox.
5. If the detailed description could be improved with a picture, then take one and upload it through the Choose Files dialog.
6. When all information is complete, click the Report problem button.

Log out of the lab.

Cleanroom and Soft Lithography labs only.



Logout tablet

1. Scan your badge at the exit tablet to log out of the lab.
2. The tablet will show a green background if no tools are in use and a red background if tools are still in use.

Restrictions:

- You must leave the lab before the reservation end time to allow others to enter.
- Staying beyond your reservation time can prevent other users from entering the lab.
- Late exit times are reported to the lab manager and may result in loss of access.

Safety

If you observe any safety issues, please report them immediately.

On the landing page, click the “Safety suggestions” icon to open the safety page.



NEMO Calendar Tool control Status dashboard Administration ▾ Welcome, Jerry ⚙

Safety suggestions and observations

For emergency related safety issues involving chemicals spills and exposures, fires, toxic gas release, or any personal injuries you must call the Emergency Services Group at extension 2222 from any NIST phone. For emergency calls from your cell phone, call 301-975-2222 or 911 and tell them you are at NIST in Gaithersburg, MD and they can activate the NIST Emergency Services for you.

NIST and CNST value safety and strive to create a safe working environment for everyone. We invite your suggestions and observations in order to provide a safer and more effective environment for all users and staff. Use this form to report non-emergency related safety issues, unsafe working conditions, housekeeping suggestions, or observations directly to the NanoFab management. This will generate an email that will be automatically sent to the NanoFab management. You can send your comments or concerns completely anonymously or provide your name so that we can follow up with you within 3 business days. If you feel this should be handled sooner than 3 business days, you should contact the NanoFab manager Rob Illic directly by phone at 301-975-3712.

You can also [view past safety issues that have been resolved](#).

Report a new safety issue

Where is the problem? **1**

Why are you concerned? **2**

Report this issue anonymously. **3** your name will not be visible to staff. There will be no way for us to follow up with you about how the safety issue was resolved.

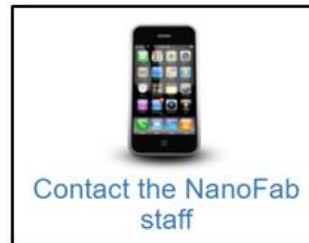
Report a new safety concern **4**

1. Provide the location of the problem observed.
2. Provide details of the safety observation or suggestions. The more information provided, the easier it will be for the staff to identify and resolve the issue.
3. If you prefer not to identify yourself, click the check box to report anonymously. However, staff will not be able to contact you for clarifications or questions.
4. Click the “Report a new safety concern” button to submit. Staff will be notified and take action as needed.

Staff contacts

If you require assistance, contact a staff member or the user office.

On the landing page, click the “Contact NanoFab staff” icon to open a directory listing of all staff members.



Contact information

Staff



Captain NEMO

Email: captain@nemo.com

Office phone: (240) 555-1212

Mobile phone:

- [Call \(240\) 555-1234](tel:2405551234)
- [Send a text message](#)

Office location: Building 7 Room 42

1. Staff member email address is also a mail link.
2. Phone numbers are also call links when accessed from a mobile device.
3. Send a text message is also a message link when accessed from a mobile device.
4. Office location identifies where the staff member can be found if not in the lab.

Status Dashboard

The status dashboard provides a current view of area occupancy and tool usage. From any NEMO page, click 'Status dashboard' on the navigation bar to access the page.

Area occupancy

Area occupancy displays a summary of all users, staff, and service personnel in an occupancy-controlled lab. The default status dashboard view is area occupancy.

The screenshot shows the NEMO Status Dashboard interface. At the top, the navigation bar includes 'NEMO', 'Calendar', 'Tool control', 'Status dashboard' (highlighted with a red box and labeled 1), and 'Administration' (with a dropdown arrow). Below the navigation bar, the main heading is 'Status dashboard', followed by two view toggles: 'Area occupancy' (highlighted with a red box and labeled 2) and 'Tool status & usage'. A legend below the toggles states: 'Staff members are highlighted in green.', 'Service personnel are highlighted in orange.', and 'Users with expired reservations are highlighted in red.' Below the legend, the 'Cleanroom' section is highlighted with a red box and labeled 4. It shows '6 / 12 people (+ 4 staff)' (labeled 3) and a table of users. The table has three columns: 'User', 'Since', and 'Working on project...'. The users listed are Pradeep Namboodiri, Rich Kasica (green), Satrick Richardson (green), Peter Litwinowicz (green), Joseph Di Pasquale (green), Daron Westly, Taekyung Kim, Yanxue Hong, Junyeob Song, and Eikhyun Cho.

User	Since	Working on project...
⊗ Pradeep Namboodiri	Wednesday @ 9:32 AM	Single Atom Devices
⊗ Rich Kasica	Wednesday @ 10:06 AM	NanoFab Staff
⊗ Satrick Richardson	Wednesday @ 9:12 AM	NOG Maintenance
⊗ Peter Litwinowicz	Wednesday @ 9:40 AM	NanoFab Staff
⊗ Joseph Di Pasquale	Wednesday @ 9:41 AM	NanoFab Staff
⊗ Daron Westly	Wednesday @ 9:00 AM	N19.0030 Integrated photonics for addressing atomic sys...
⊗ Taekyung Kim	Wednesday @ 9:20 AM	N09.0023 Micro- and Nanoelectromechanical Systems [I...
⊗ Yanxue Hong	Wednesday @ 9:54 AM	N13.0028 Enriched Silicon-28 Test Structures and Materi...
⊗ Junyeob Song	Wednesday @ 9:39 AM	N20.0010 Photonic interfaces for atomic clocks
⊗ Eikhyun Cho	Wednesday @ 9:19 AM	N09.0023 Micro- and Nanoelectromechanical Systems [I...

1. Status dashboard link on navigation bar. Click to access the status dashboard page.
2. Area occupancy is the default view. Click 'Tool status & usage' to switch views.
3. Current users out of total users allowed is displayed as well as staff and service personnel.
4. User details include login day/time and current project.

Tool status & usage

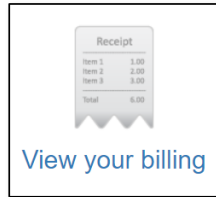
Tool status & usage displays a summary of tools currently in use and their status. The default tool display is usage.

Tool	User	In use since...
790 RIE Middle	Junyeob Song (jns27)	Wednesday @ 10:13 AM
A102 Spinner Right	Taekyung Kim (tnk20)	Wednesday @ 10:02 AM
E-Beam and Thermal Evaporator	Biswarup Guha (bng4)	Wednesday @ 8:40 AM
JEOL E-beam Cleanroom	Pradeep Namboodiri (pradeep)	Wednesday @ 10:32 AM
Leica EM GP	Hsin-Yun Chao (hnc17)	Wednesday @ 9:59 AM
RHL Tube 1 Oxide	Daron Westly (daw1)	Wednesday @ 10:31 AM
SPTS Deep Si Etch	Eikhyun Cho (enc6)	Wednesday @ 9:27 AM
SPTS HF Vapor Etcher	Taekyung Kim (tnk20)	Wednesday @ 9:53 AM
TITAN TEM	Alline Myers (afmyers)	Wednesday @ 8:49 AM
Unaxis Deep Si Etcher	Jessie Zhang (cnz5)	Wednesday @ 9:43 AM
XRD	Kerry Siebein (kns1) on behalf of Daron Westly (daw1)	Wednesday @ 10:34 AM
ZEISS FESEM	Yanxue Hong (hny2)	Wednesday @ 10:05 AM

1. Status dashboard link on navigation bar. Click to access the status dashboard page.
2. Area occupancy is the default view. Click 'Tool status & usage' to switch views.
3. Filter. Click the drop down to select what information to display.
 - a. Tools in use – the default view displays tools that a user or staff are currently logged into.
 - b. Problematic tools – displays tools that have a problem or shutdown active.
 - c. Idle tools – displays tools that are not currently in use.
 - d. All tools – displays all tools listed in NEMO.
4. Tool details include Tool name with status icons, current user if enabled, and login day/time if enabled.

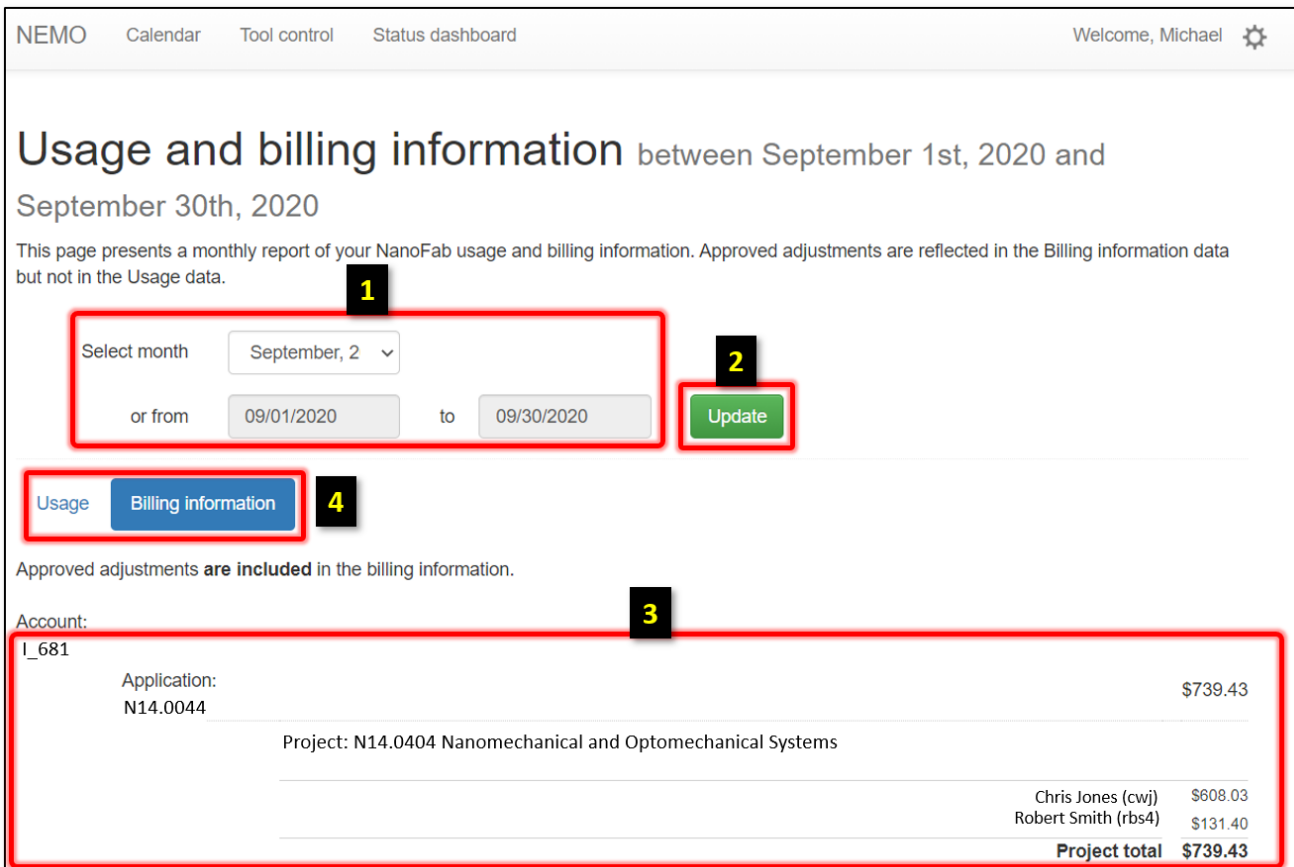
View your billing

The view your billing dialog can be used to review NEMO activity and charges. On the landing page, click the “View your billing” icon to open the billing page.



Billing Information

The billing information view displays a summary of actual charges. If the user is also the PI, a summary of charges by each user on the project is displayed. Charges can be displayed by month or a date range can be entered. The default view your billing view is billing information.



The screenshot shows the NEMO interface with the following elements:

- 1**: A red box highlights the date selection area, including a "Select month" dropdown (set to "September, 2"), "or from" and "to" date inputs (set to "09/01/2020" and "09/30/2020"), and an "Update" button.
- 2**: A black box highlights the "Update" button.
- 3**: A black box highlights the "Account:" label above the account details table.
- 4**: A black box highlights the "Billing information" tab in the navigation bar.

Account: I_681

Application: N14.0044		\$739.43
Project: N14.0404 Nanomechanical and Optomechanical Systems		
	Chris Jones (cwj)	\$608.03
	Robert Smith (rbs4)	\$131.40
	Project total	\$739.43

1. Select a month/year from the drop down or enter a date range.
2. Click update to load data for the selected range.
3. Details are provided and summarized by account, application, and project. If the user is also the PI for the project, a summary of each authorized user is also displayed.

4. The view can be switched between billing information and usage details by clicking the appropriate button.

Usage

The usage view displays a summary usage events for the current user.

Usage and billing information between September 1st, 2020 and September 30th, 2020

This page presents a monthly report of your NanoFab usage and billing information. Approved adjustments are reflected in the Billing information data but not in the Usage data.

1. Select month: September, 2
or from: 09/01/2020 to: 09/30/2020
2. Update

4. Usage | Billing Information

Adjustment activities **are not included** in the usage information. 3.

Area access

Cleanroom
Wednesday, September 2nd, 2020 @ 7:01 AM
Wednesday, September 2nd, 2020 @ 11:35 AM
Charged to project N09.0005 Single Electron and Single Atom Devices for Electrical Current Standards & Quantum Info

Cleanroom
Tuesday, September 1st, 2020 @ 7:01 AM
Tuesday, September 1st, 2020 @ 11:17 AM
Charged to project N09.0005 Single Electron and Single Atom Devices for Electrical Current Standards & Quantum Info

Tool usage

Sputter B104 Left
Wednesday, September 2nd, 2020 @ 7:36 AM

1. Select a month/year from the drop down or enter a date range.
2. Click update to load data for the selected range.
3. Usage details are provided by area access, tool usage, supplies and consumables, staff charges, training sessions, and missed reservations. Details are provided include date/time, project, and area/tool/supply.
4. The view can be switched between billing information and usage details by clicking the appropriate button.

News and events

The news and events dialog is used to provide users important information such as upcoming lab events, new tools, or large facility projects.

On the landing page, click the “News and events” icon to open the page.



Recent news

1

Stories that were updated recently appear first.

You can also [view archived news.](#)

2

3

Updated weekday after hour escort policy

Originally published on Wednesday, September 11th, 2019 @ 8:58 AM by Robert Ilic (bri):

Due to increased NIST campus security and limited NanoFab staff availability, we've restricted external NanoFab user access after 7 pm to require users to stay until midnight, at which time staff was available to provide escort from the NIST campus. We realize this has been restrictive to some users that need to stay on campus after 7 pm but not until midnight. Consequently, we are adding a second escort time that promptly leaves the NIST campus at 9:30 pm.

Weekday access after 7 pm will be permitted within the following guidelines:

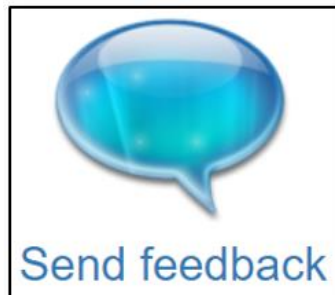
- On the day you plan to stay until 9:30 pm or midnight, you must email NanoFab management (nfmanage@nist.gov), Matt Robinson (matthew.robinson@nist.gov), and Robert Jens (robert.jens@nist.gov) by 4 pm indicating your intention to stay late.
- After 7 pm, you are required to remain inside of the NanoFab cleanroom. Leaving the cleanroom without a NanoFab staff member escort could result in losing your campus access. Please note that the D101 room (area where the ASML design station and the cleanroom log in tablet reside) is not considered cleanroom space.
- Meet in the gowning room 10 minutes ahead of the designated escort time (9:20 for 9:30 escort or 11:50 for midnight escort). Please plan your work accordingly so that you are on time to meet your escort. Users who miss the 9:30 escort will be escorted at midnight.

1. The news and events page opens to the recent news page.
2. Click the 'view archived news' link to see older news articles.
3. Scroll through articles.

Send Feedback

The send feedback page is a convenient way to inform staff of non-emergency issues or suggestions.

On the landing page, click the “Send feedback” icon to open the page.



Submit feedback about the NanoFab

We're continually working to improve the NanoFab experience for everyone.
Do you have an idea to make the NanoFab better? Send us your feedback!

1

2

1. Type the message to send to the NanoFab staff in the text box.
2. Click the “Send feedback” button to send the message.