

# **Manual of UBSN Data Management System (DMS)**

(Last updated May 19, 2020)

## **Background**

UBSN DMS is a complete solution for researchers to manage their research outputs. After conducting research in one of UBSN's facilities, users will be able to upload the data to an online platform that is easily accessible and secure. Users can download their data to their local computers or choose to use one of our remote services for processing data online.

The UBSN DMS has the following aims:

- To provide a user interface to facilitate data retrieval
- To provide space for automatic data storage and even processing
- To allow setting up of researcher accounts and project accounts to facilitate management
- To facilitate cross-talks between researcher by providing a platform for easy data exchange and easy access to relevant information (e.g. a search system for project descriptions, methodologies, neural substrates, keywords, researchers).

UBSN DMS is composed of three components, including (1) the UBSN Data Archive for storing of data captured using our UBSN facilities, (2) the Virtual Lab (vLAB) Remote Desktop Service for users to processing their data online, and (3) the UBSN High Performance Computing Service for advanced heavy-duty data analysis.

This user guide provides guidelines on how to make use of the functions and features of these components.

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# 1) UBSN Data Archive

The core component of the UBSN DMS is the UBSN Data Archive. It is based on a customized version of the popular open source imaging informatics software, namely the Extensible Neuroimaging Archive Toolkit (XNAT). XNAT was originally developed by the Neuroinformatics Research Group at Washington University (Marcus et al. 2007). It provides the following functions:

- Uploading neuroimaging data
- Organizing and sharing data
- Viewing and downloading data
- Securing and managing access to data
- searching and exploring large data set
- running complex processing on data using high-powered computing

Due to its high extensibility, XNAT can be customized to support a wide range of neuroscience research data, including those involved in ongoing and prospective projects in UBSN such as fMRI, DTI, EEG and fNIRS. It also provide application programming interface (API) so that researchers can write custom scripts on High Performance Computer Clusters based on popular programming languages such as Python to exchange data with the system and perform intensive data analysis on the clusters.

## 1 Setup of Account

### 1.1 Registration

Clicking “Register Here” to register a new account to access the data storage system.



Welcome to the UBSN Neuroimaging Database. If you are already registered, please select "LDAP" and login with your net ID and password.

If not, please [REGISTER HERE](#)

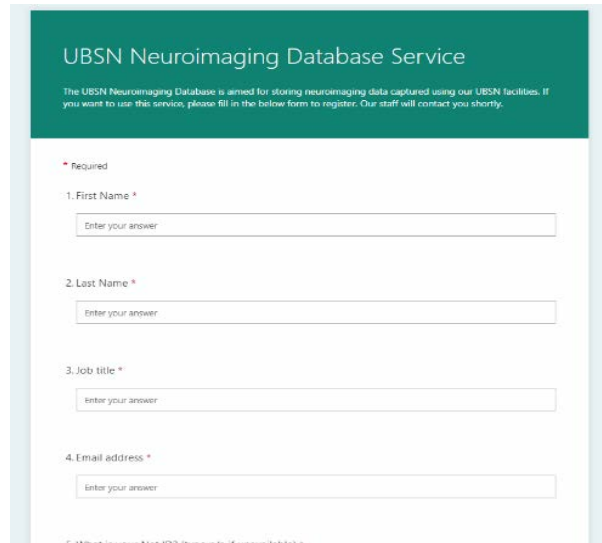
If you need to access to our vLAB desktop, please [CLICK HERE](#)



LOGIN
<input type="text" value="LDAP"/>
USER
<input type="text" value="kevin"/>
PASSWORD
<input type="password" value="*****"/>
<input type="button" value="Login"/>

### 1.1.1 Filling information

Filling personal information in all the compulsory fields to register an account.



The screenshot shows a registration form for the "UBSN Neuroimaging Database Service". The form has a teal header with the service name and a brief description. Below the header, there is a list of required fields, each with a red asterisk and a "Required" label. The fields are: 1. First Name, 2. Last Name, 3. Job title, 4. Email address, and 5. What is your NMR ID? (think n/a if unavailable). Each field has a text input box with a placeholder "Enter your answer".

UBSN Neuroimaging Database Service

The UBSN Neuroimaging Database is aimed for storing neuroimaging data captured using our UBSN facilities. If you want to use this service, please fill in the below form to register. Our staff will contact you shortly.

\* Required

1. First Name \*

Enter your answer

2. Last Name \*

Enter your answer

3. Job title \*

Enter your answer

4. Email address \*

Enter your answer

5. What is your NMR ID? (think n/a if unavailable) \*

Clicking “Submit” button below the fields to finish the registration. Please wait for our staff to process your application. Our staff will contact you when your account is approved.

### 1.1.2 Verification via email

Checking corresponding email and clicking the link the verify and activate the account.

## 1.2 Login

Entering the username and password to login. Make sure “LDAP” is selected.

LOGIN

"LDAP"

USER

kevin

PASSWORD

.....

Login

### 1.3 Retrieval of account information

If the username or password of an account is forgot, user may click “Forgot login or password” to access the following page.

Entering the corresponding field and send an email to verify and retrieve the missing information of the account.

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POLYTECHNIC UNIVERSITY  
香港理工大學

UBSN  
University Research Facility in  
Behavioural and Systems Neuroscience  
香港理工大學中心實驗室

Online Booking

Did you forget your username? Enter your email address and the matching username will be emailed to you.

EMAIL

Request

Resend email verification | Return to Login Page

Did you forget your password? Enter your username and a new password will be emailed to you.

USERNAME

Request

## 2 Structuring of Files

### 2.1 Brief introduction on Brain Imaging Data Structure (BIDS)

To facilitate the sharing of experimental data, a standardized folder structure and naming system named BIDS is adopted in this data storage system. It is compatible with many existing software and so can help enhance the sharing and reusing of those important and valuable data within and among different laboratories.

In short, the folder structure is in a 4-level design and can be described in a narrow down manner from project, subject to session and its acquisition. The data storage should be managed in accordance with this structure.

```
project/  
└── subject  
    └── session  
        └── acquisition
```

### 2.2 Naming rule of folders

(example to be brought)

#### 2.2.1 Project

The project folder can simply be named by any descriptive name for data files to be included.

#### 2.2.2 Subject

The subject folder should be named by “sub-`<participant label>`” where the label should be unique for each subject.

#### 2.2.3 Session

The session folder should be named by “ses-`<session label>`” where the label should be unique for each session.

### 2.3 Creating items

#### 2.3.1 Project

### 2.3.2 Subject

By clicking the existing subject in the table, a page of project details corresponding to the particular project would be shown as below.

Logged in as: gslachen | Auto-logout in: 0:14:36 - renew | Logout

Browse New Upload Tools Help

Advanced Search

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UBSN University Research Facility for Behavioral and Systems Neuroscience 香港科學中心實驗室

Online Booking

Drowsiness study and algorithm validation

Details Access Manage Pipelines

ID: DrivingEEG Aka: Driver drowsiness  
Description: Neural responses will be captured using electroencephalography (EEG), physiological features, and facial expressions. Behaviors associated to drowsiness will be analyzed.  
Keywords: Drowsiness, EEG, algorithm validation  
PI: Ting, KH  
Investigators: Yu, Kevin

Edit Details Delete Manage Custom Variables

Actions

- Add
- Upload Images
- View Prearchive
- Scan Type Cleanup
- Add to Favorites
- Download XML
- Download Images
- Manage Files

Subjects

Add Tab

<< first < prev 1 next > last >> 200 1 of 1 Pgs (9 Rows) Reload Options

Subject	MF	Hand	YOB	EEG Sessions
subj1	M	R		1
subj2	M	L		1
subj3	M	R		1

Clicking “Add” on the list and selecting “Subject” to add a new subject within the current project.

Logged in as: gslachen | Auto-logout in: 0:13:46 - renew | Logout

Browse New Upload Tools Help

Advanced Search

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PI: Ting, KH  
Investigators: Yu, Kevin

Edit Details Delete Manage Custom Variables

Actions

- Add
- Subject
- EEG Session
- EEG Session
- More
- Download XML
- Download Images
- Manage Files

Subjects

Add Tab

<< first < prev 1 next > last >> 200 1 of 1 Pgs (9 Rows) Reload Options

Subject	MF	Hand	YOB	EEG Sessions
subj1	M	R		1
subj2	M	L		1
subj3	M	R		1

https://ubsnrds.pcc-hk.polyu.edu.hk/app/template/XDATScreen\_edit\_xnat\_subjectDetails.vm/project/DrivingEEG

Entering the information of subject to be added and pressing “Submit” after finishing so.



**Enter a new subject**

Primary Project: Drowsiness  
 Subject's ID within this project:   
 Subject's research group within this project:


---


**Demographics**

Please Select One  
☒ Date Of Birth    
☐ Year Of Birth  
☐ Age

YOB/DOB/Age

Gender   
 Handedness   
 Education   
 Race   
 Ethnicity   
 Height (inches)   
 Weight (lbs)   
 Recruitment Source





UNIVERSITY OF 

### 2.3.3 Session

By clicking the existing subject in the table, a page of subject details corresponding to the particular subject would be shown as below.

Logged in as: gslachan | Auto-logout in: 0:14:35 - [review](#) | [Logout](#)


[Browse](#) [New](#) [Upload](#) [Tools](#) [Help](#) [Advanced](#)

  [Online Booking](#)

[PROJECT: DrivingEEG](#) > [subj1](#)

Subject Details: subj1

Details	Projects	Actions
Accession # XNATPOC_S00058 Date Added 2019-09-10 17:46:41.179 (kevin) Birth year -- Gender Male Handedness Right Education 12 Height (inches) 5.5 Weight (lbs) 140.0		<a href="#">Edit</a> <a href="#">View XML</a> <a href="#">Add Experiment</a> <a href="#">Download XML</a> <a href="#">Email</a> <a href="#">Manage Files</a> <a href="#">Delete</a>




**Experiments**


Date	Experiment	Project	Label
2019-03-11	<a href="#">EEG Session</a>	Drowsiness	session1

Clicking “Add Experiment” on the list to select the type of experiment session to be added under the subject.

Logged in as: gslachan | Auto-logout in: 0:14:38 - [refresh](#) | [Logout](#)

[Browse](#) [New](#) [Upload](#) [Tools](#) [Help](#) [Advanced](#)

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神經科學中心實驗室

[Online Booking](#)

**DrivingEEG**

Project: **DrivingEEG**

Subject: **subj1**

What type of experiment are you entering?  
(clicking anywhere in the experiment row will immediately create a new experiment)

Filter:

<b>EEG Session</b> Electroencephalography Session
<b>fNIRS Session</b> DICOM study of undetermined type
<b>MR Session</b> An event in which MR scans are obtained on a subject

Entering the information of experiment session of the particular subject.

[PROJECT: DrivingEEG](#) > [subj1](#)

**Add New EEG Session**

Project: **Drowsiness**

Subject: **subj1**

Session:  \*

---

Date:

Visit ID:

Scanner Name:

Manufacturer: (undefined)  
Model: (undefined)

Acquisition Site:

---

Scans

Entering the information of subject to be added and pressing “Submit” after finishing so. Noted that compulsory yet unnecessary fields of scans have to be removed by clicking on the sign of bin.



## Edit Project Details

**Step 1: Enter project details**

Define the details of this project. The 'Project ID' should be a single word or acronym which will identify your project. It will be used on the file system to name directories and files, so it shouldn't contain any wild characters or spaces. The 'Running Title' will be used throughout the website to identify your project.

**Project Title** Drowsiness study and algorithm validation

**Running Title** Drowsiness

**Project ID** DrivingEEG

**Project Description** Neural responses will be captured using electroencephalography (EEG), physiological features, and facial expressions. Behaviors associated to drowsiness will be analyzed.

**Keywords** Drowsiness, EEG, algorithm validation

**Alias(es)** Driver drowsiness

**Investigator(s)** Primary Investigator: Ting, KH [Edit Selected](#)

**Other Investigators:**  
Yu, Kevin ㄗ

Create Investigator

**Step 2: Define Project Accessibility**

Clicking “Save Changes” after making changes in details.

**Keywords** Drowsiness, EEG, algorithm validation

**Alias(es)** Driver drowsiness

**Investigator(s)** Primary Investigator: Ting, KH [Edit Selected](#)


**Other Investigators:**  
Yu, Kevin ㄗ

Create Investigator

**Step 2: Define Project Accessibility**

Select the accessibility of your project.

<input type="radio"/> Private	All users will be able to see your study title and description, but only collaborators you approve will be able to analyze and download data.
<input checked="" type="radio"/> Protected	
<input type="radio"/> Public	

 [Save Changes](#)

## 3 Files Management

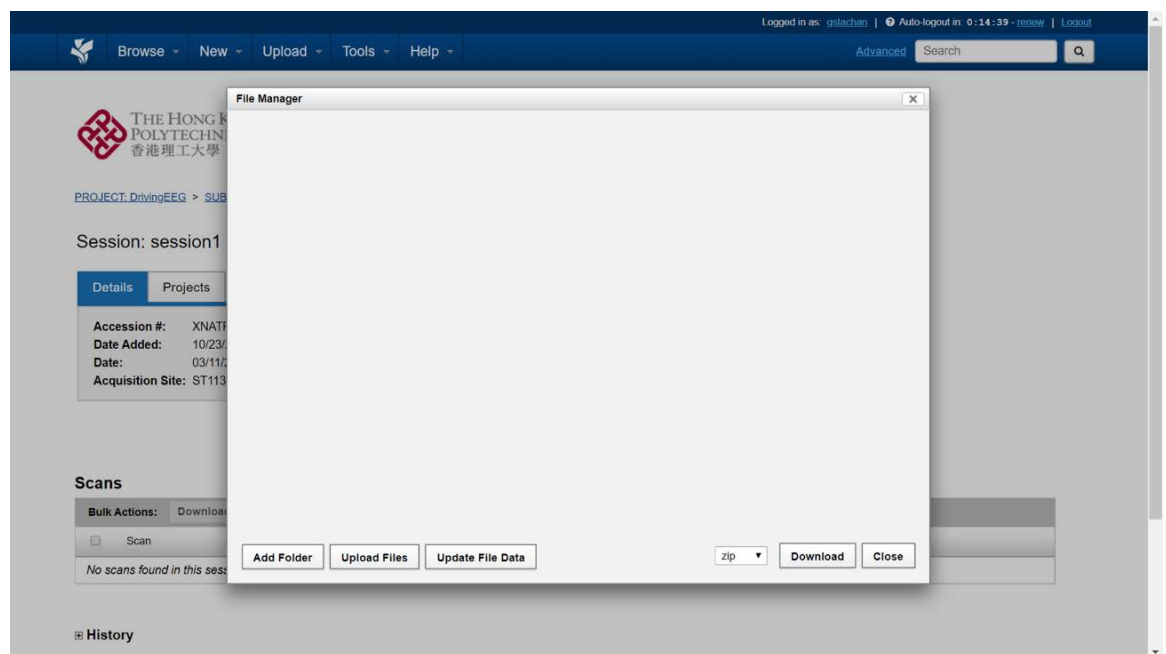
### 3.1 Uploading files

#### 3.1.1 Accessing storage location

Accessing the layer of data storage in the project corresponding to the files to be uploaded. For example, raw data collected in the experiment should be uploaded and stored under particular session of the corresponding subject, and consent form and information sheet of the project should be uploaded and stored just under the project layer. An overview of folders and files stored can be accessed by clicking “Manage Files” on the list.

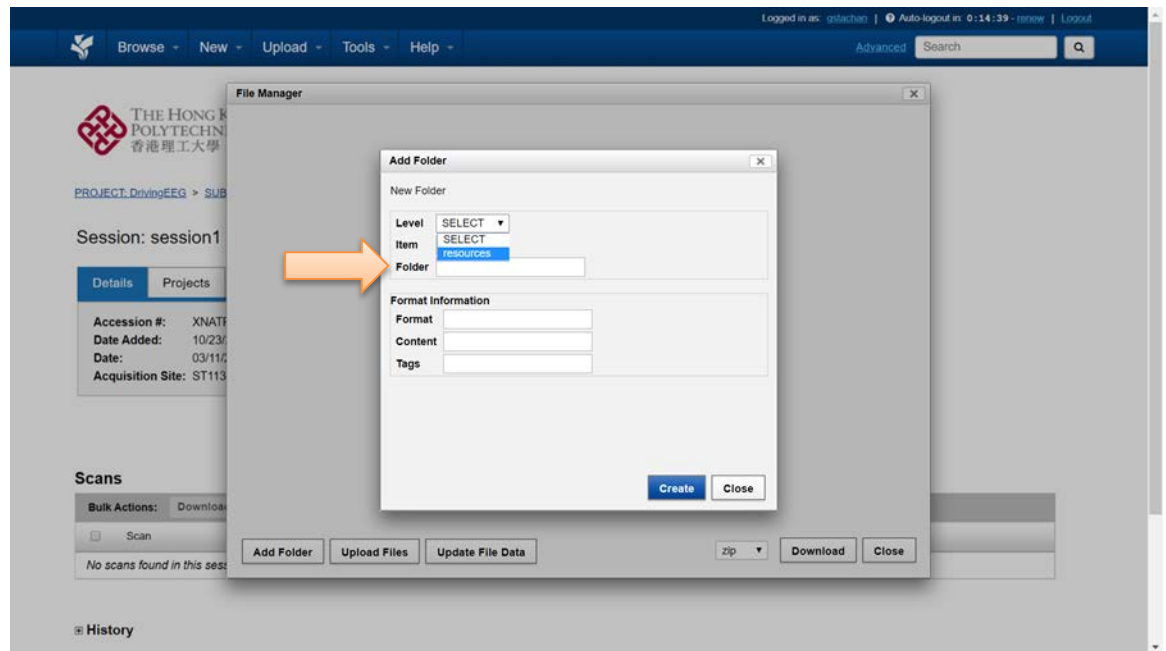
### 3.1.2 Creating folder

By clicking “Manage Files” on the list, an interface like that would be shown.



A folder named “resources” should be built with two subfolders, one serves for storage of experiment data files and the other servers for the storage of miscellaneous files. The latter one is named as “MISC” and the former one is named dependently on the type of experiment, for example it would be named “EEG” for the electroencephalography experiment.

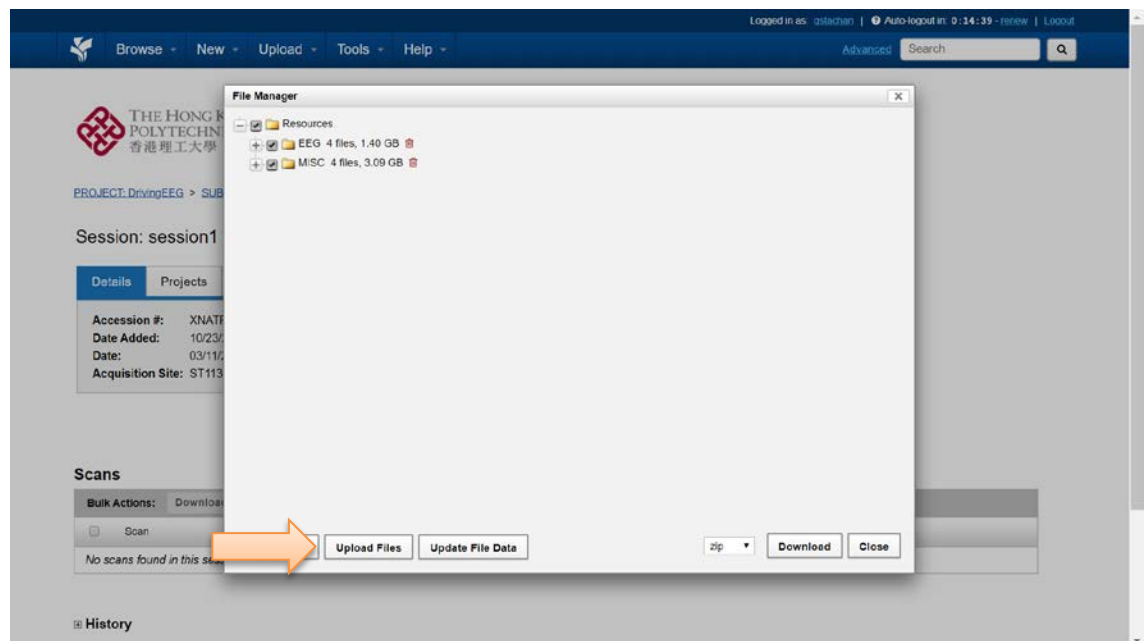
Such folder can be built by clicking “Add Folder” and entering the its information.



### 3.1.3 Selecting destination

Once the folders have been created, files can be uploaded to corresponding folder. Clicking “Manage Files” on the list.

Pressing “Upload Files” to choose the file to be uploaded.



Selecting the file to be uploaded by clicking “” button. Noted that only one file can be uploaded for each time under the webpage interface.

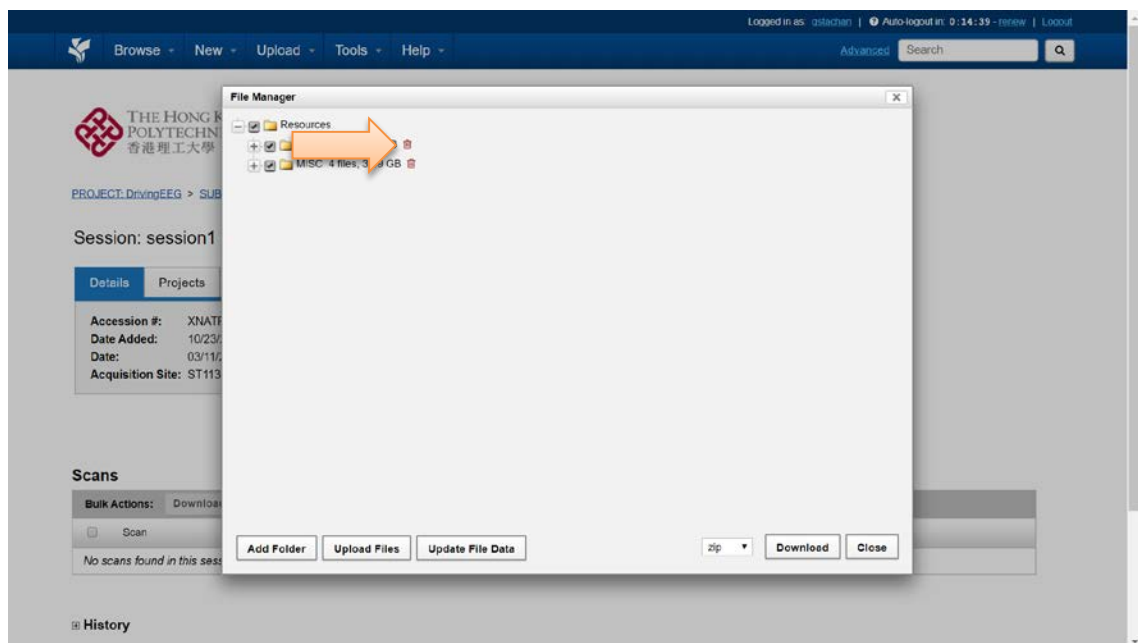
Pressing “” once the correct path is selected.

### 3.2 Download

After checking the folder or files to be downloaded, pressing the “Download” button to start download as zipped files or just the single file.

### 3.3 Removing files

Clicking “Manage Files” on the list and pressing the recycling bin next to the file to remove it from the system.



## Webpage Interface

### Registration

- Filling in some basic personal information

- Checking email to verify and activate the registered account

### Login

- Entering the ID and password to login

- Clicking if forgetting the account information

### Folder structure (BIDS)

#### Create items

- Project

- Subject

- Session

#### Edit info

#### Upload and Download

- Item related files to be uploaded to corresponding level with respect to BIDS

## Client Software Interface

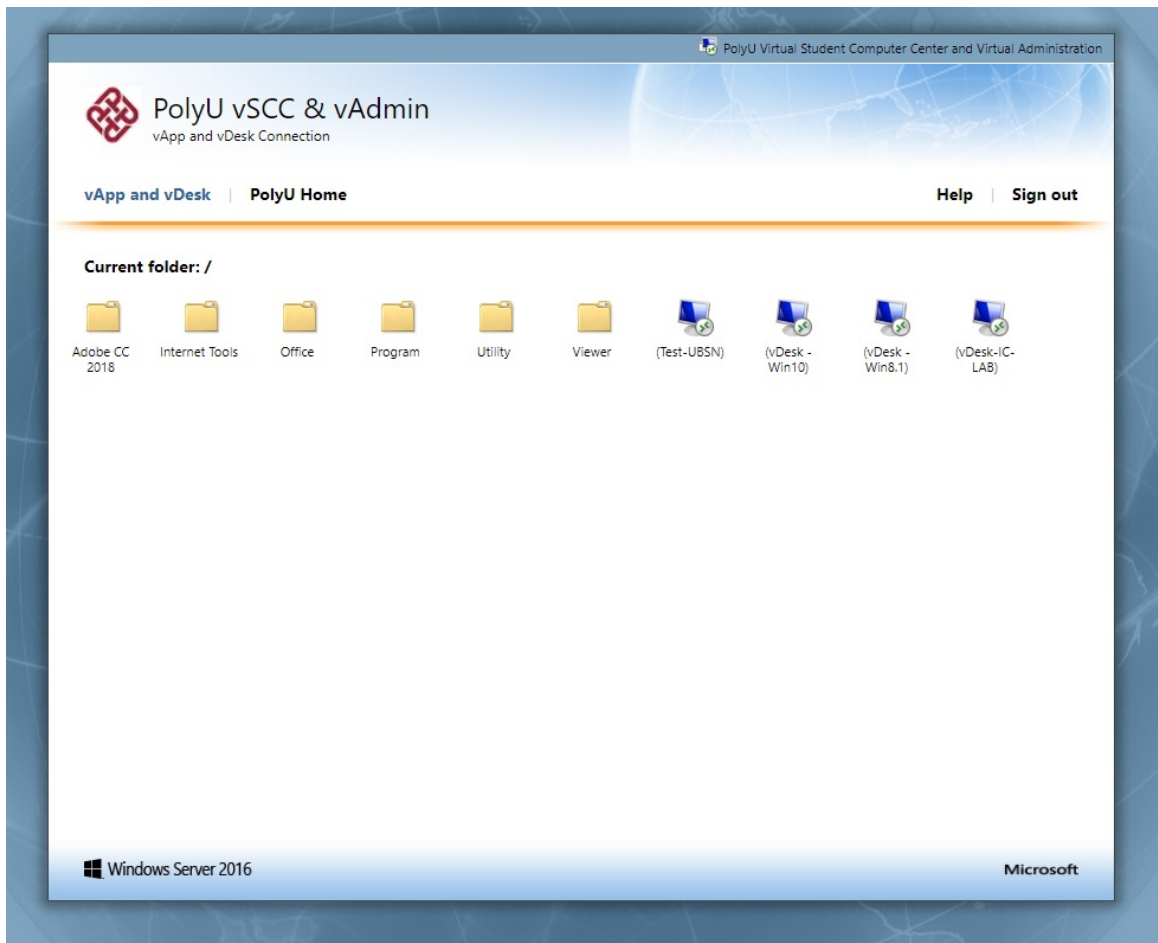
### Folder structure (BIDS)



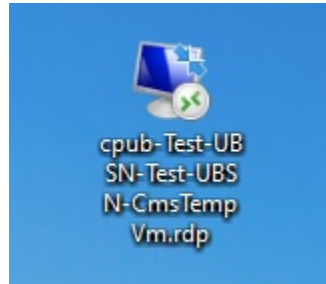
## 2) Virtual Lab (v-Lab) Remote Desktop

### 1.Starting the vLAB

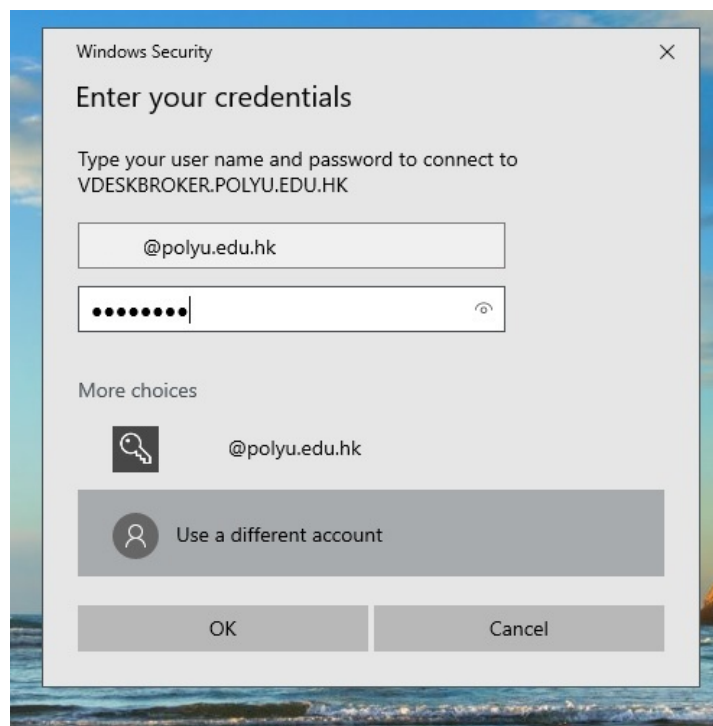
- a) Go to <https://polyu.hk/QuPUB> to register for the service
- b) Registered user can go to <https://vdesk.polyu.edu.hk/access>
- c) The following menu will appear. Press “Test-UBSN”.



- d) After pressing “Test-UBSN”, the vLAB desktop icon will be downloaded. Double click on it.



- e) After double clicking on the icon, you will be required to login with your PolyU net ID and password. Please note to enter the user name as [netid@polyu.edu.hk](mailto:netid@polyu.edu.hk).



- a. Press “OK” to start using the UBSN vLAB.

## **2. Using vLAB**

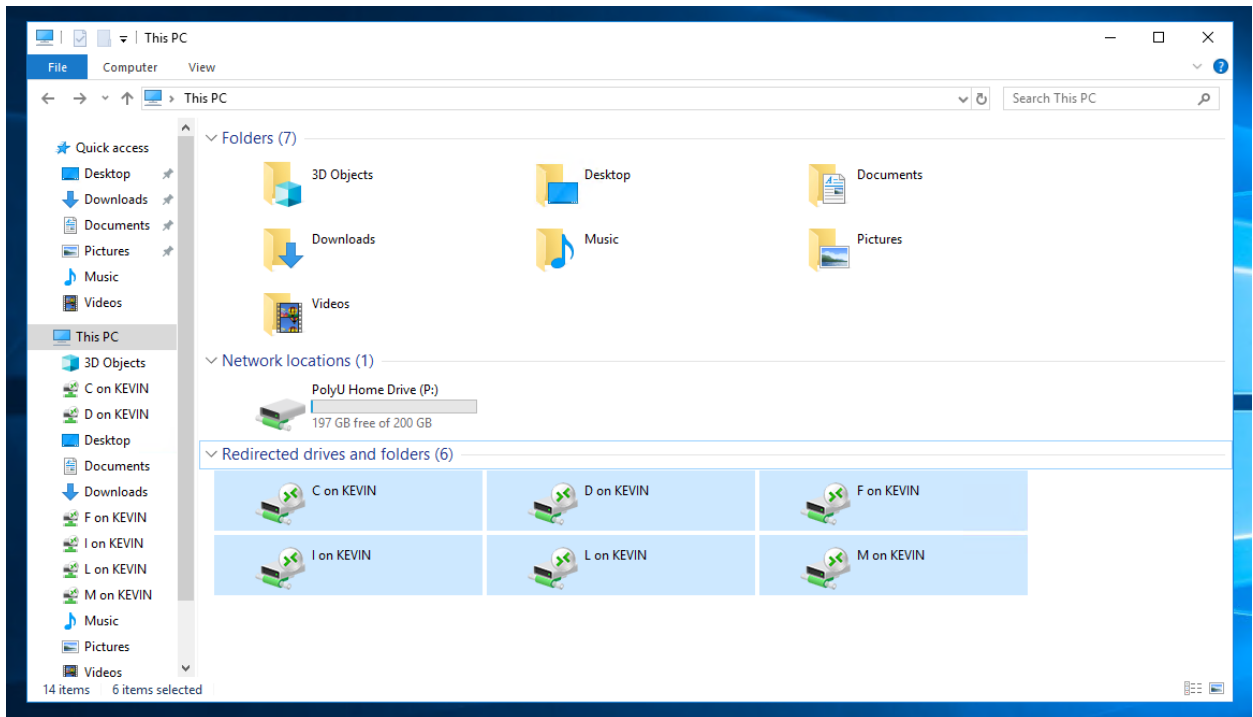
2.1 User can start any preferred program by pressing on the icon in the desktop.

2.2 In the current version of vLAB, many commonly programs are pre-installed. For example, they include:

- Curry
- Matlab
- SPSS
- E-Prime
- Zen
- Mango
- Microsoft Office

## **3. Sharing files between vLAB and Windows local computer**

3.1 Press on the “Redirected drives and folders” tab under “This PC” to access to the files on the local computer.



## 4. Running Applications

### 4.1.1 Program with Desktop Shortcuts

Double click on the desktop icon of the program that you want to start

### 4.1.2 Matlab Toolboxes

Double click on the desktop icon “Matlab 2017”. You can start the corresponding toolbox by typing:

‘spm’ – for SPM12

‘NIRS\_SPM’ for NIRS SPM toolbox

‘Homer2\_UI’ for Homer2

‘eeglab’ for EEGLAB toolbox

### 3) UBSN High Performance Computing (HPC)

#### 3.1 How to login to UBSN HPC Platform via SSH

1. Install any SSH (support protocol 2) client. Suggest to use MobaXterm (<https://mobaxterm.mobatek.net/>)
2. Use the installed SSH client to connect to RS HPC management node (IP: 10.13.20.10).
3. Login with the provided user name and password.

#### 3.2 How to change the password

1. Use SSH client to connect to RS HPC management node (IP: 10.13.20.10).
2. Login with the provided user name and password.
3. Type passwd command to change user password. Enter the new password twice. An updated successfully message will prompt when the password has updated successfully.

```
$ passwd
(current) UNIX password
New password:
Retype password:
Passwd: password updated successfully
```

#### 3.3 How to submit a job to platform by sbatch

1. Download the FSL Evaluation and Example Data Suite

```
https://fsl.fmrib.ox.ac.uk/fsldownloads/fsldownloadmain.html
```

2. Extract the downloaded suite under your home directory

```
# cd ~
# tar xzf fsl-5.0.9-feeds.tar.gz
# cd ~/fsl/feeds
```

3. Prepare a slurm job script file. Change the marked RED as you needed. (Filename: slurm\_job).

```
#!/bin/bash
```

```
#SBATCH --time=08:00:00      # walltime
#SBATCH --ntasks=1          # number of processor cores
#SBATCH --mem-per-cpu=4096  # memory per CPU core by
                             # megabytes
#SBATCH --job-name="FSL feeds" # job name. If not specific,
                             # the default is the name of the batch script
#SBATCH --partition=rshpcq01 # job queue. If not specific,
                             # the default queue will be used
./RUN all
```

Remark:

- a. The maximum number of ntasks is 48
- b. The maximum walltime is 168:00:00 (7 days)

4. Submit job to the platform

```
# sbatch slurm_job
```

### **3.4 How to submit a job to platform by srun**

1. Download the FSL Evaluation and Example Data Suite

```
https://fsl.fmrib.ox.ac.uk/fsldownloads/fsldownloadmain.html
```

2. Extract the downloaded suite under your home directory

```
# cd ~
# tar zxf fsl-5.0.9-feeds.tar.gz
# cd ~/fsl/feeds
```

3. Quick submit job to the platform

```
# srun -nl ./RUN all > output.txt &
```