RDC – Remote Desktop to your NBER PC.

Background

NBER staff can access their NBER desktop computer from a remote location. Because the Remote Desktop protocol can be set in an unencrypted fashion, we have blocked such connections at NBER's firewall. The method to connect to your NBER PC is via a secure shell (SSH) tunnel, which will route(tunnel) all communication between your remote(home) PC your NBER Desktop PC via the "ssh" protocol through a server at NBER.

Schematically:

| Your Remote/Home PC Device Port 3391 | | Ssh server Port 22 | | Your NBER Desktop Port 3389 | → |
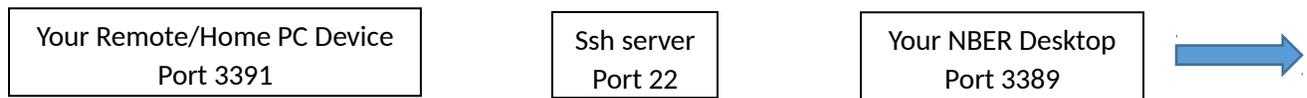
This setup is a three part set up. The first part is a one-time setup. The other two are to make the Remote Desktop connection.

What information you would need for the setup?

a) Your NBER Desktop's hostname or IP address. For the most part the NBER IT will supply you with this information. There is a general convention that we follow which is based on Floor, and Office Room Number or proximity to it. As an example: 3rdflnear316.staff.nber.org will mean On the 3rd floor, and near Office Number 316. If it is Office 316 itself, the hostname would be 3rdfl316.staff.nber.org. If for any reason this is not known, or not given to you, you can find this out by going to the section, **"Finding my NBER PC's IP address"** later in this document.

b) The NBER PC needs to remain ON at all times, and Remote Desktop to this PC needs to be allowed at all times. We have pushed out centralized policies that take care of both of these, but for some reason your PC doesn't appear to have these settings, please go to the section, **"NBER PC's Allow RDP and Power Setting"** later in this document.

c) An ssh client. There are many ssh clients, and some of you have used different ones, but we will describe only PuTTy here, as this is a single precompiled downloadable program that doesn't need additional installation. You can download PuTTy

        64 bit version: https://the.earth.li/~sgtatham/putty/latest/w64/putty.exe
        32 bit version : https://the.earth.li/~sgtatham/putty/latest/w32/putty.exe

        Most computer are now on 64-bit architecture. So please try that first.

Setup Part 1: SSH tunnel (One time setup)

Now we are operating on your remote PC (**your home computer**).

Assuming that you downloaded PuTTy (which can either be in your "Downloads" folder, or your Documents" folder), you can double click on it to start it up. If you desire for it to show up on your Desktop screen, you can copy the putty.exe file from Downloads folder to your Desktop folder.

Double click on the Putty Icon
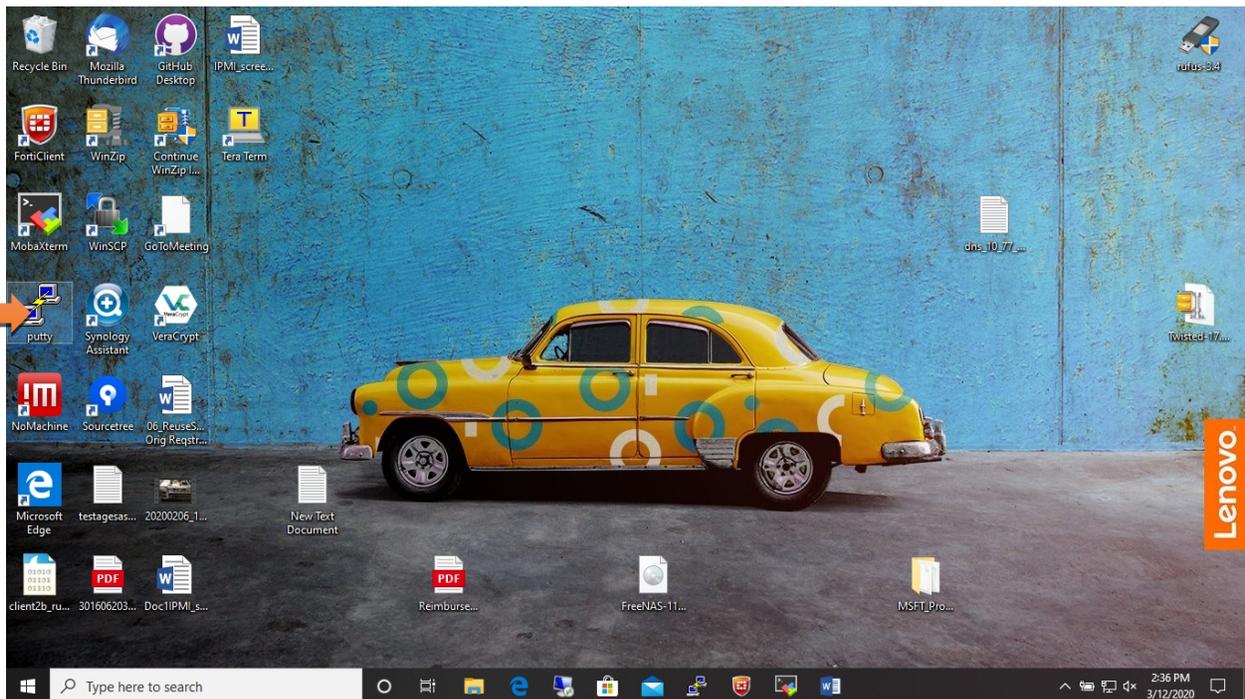
You will see the following pop up.
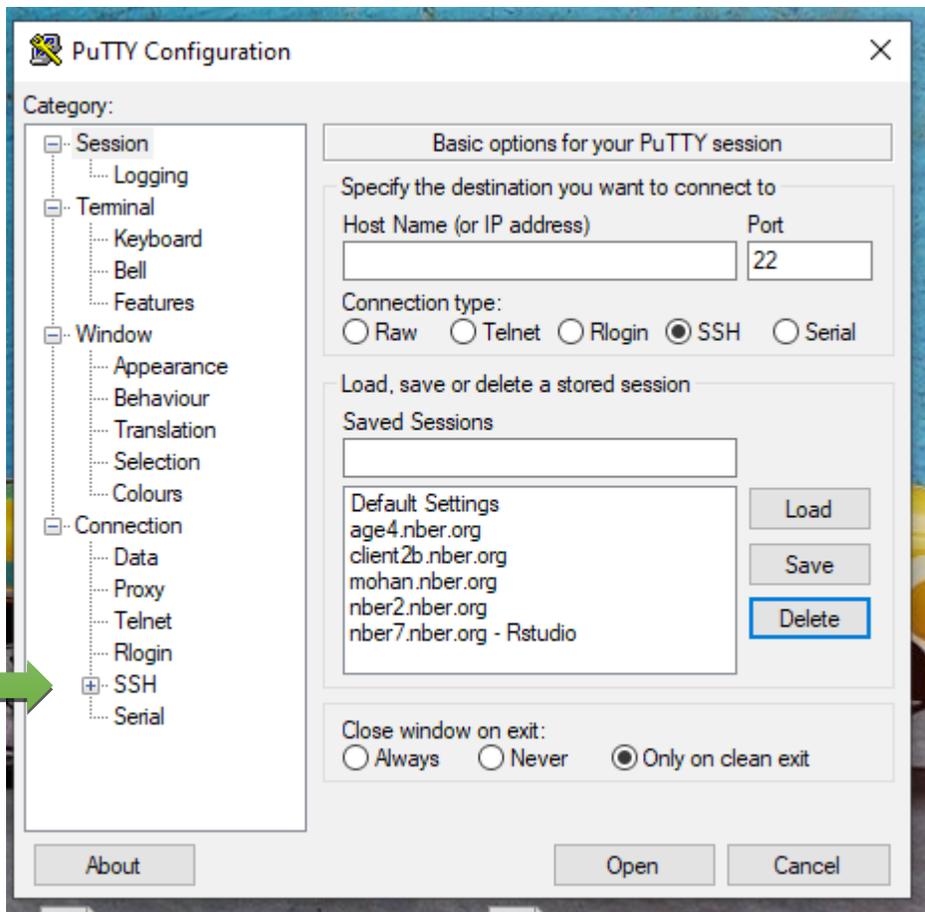
First click on the + to the left of SSH to expand options within SSH as indicated above.

Click on the "Tunnel" as indicated below:
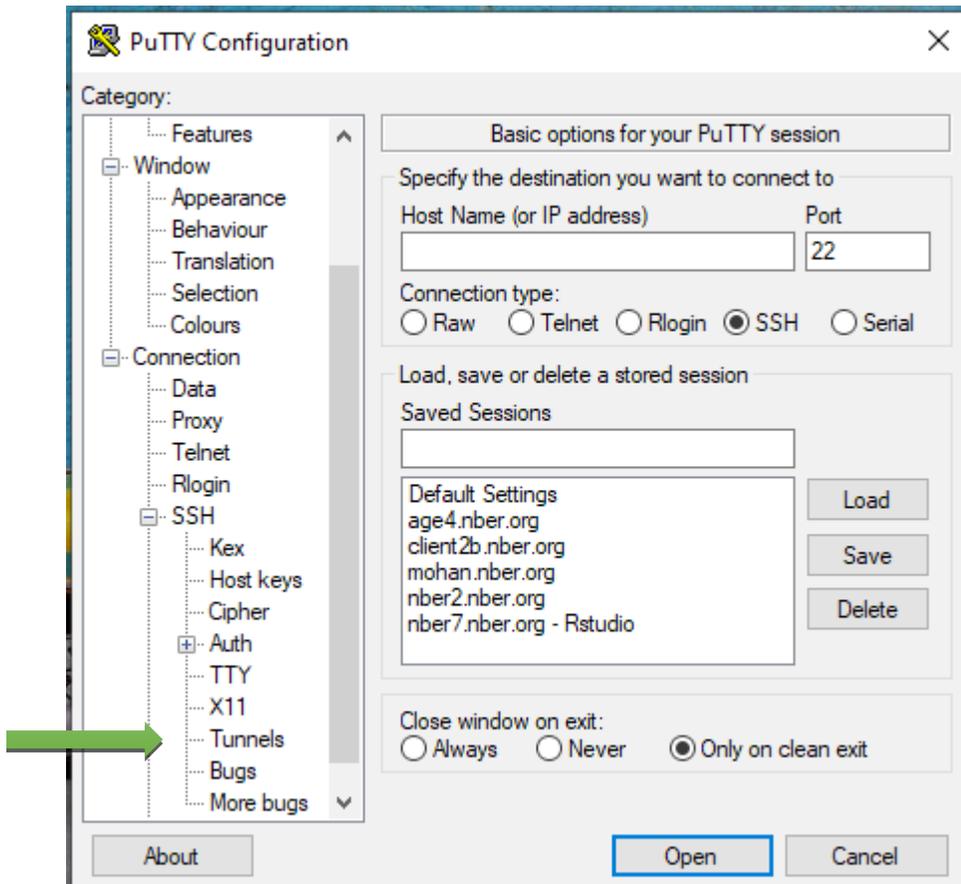
You will see the following in the right section of the PuTTY screen as below:
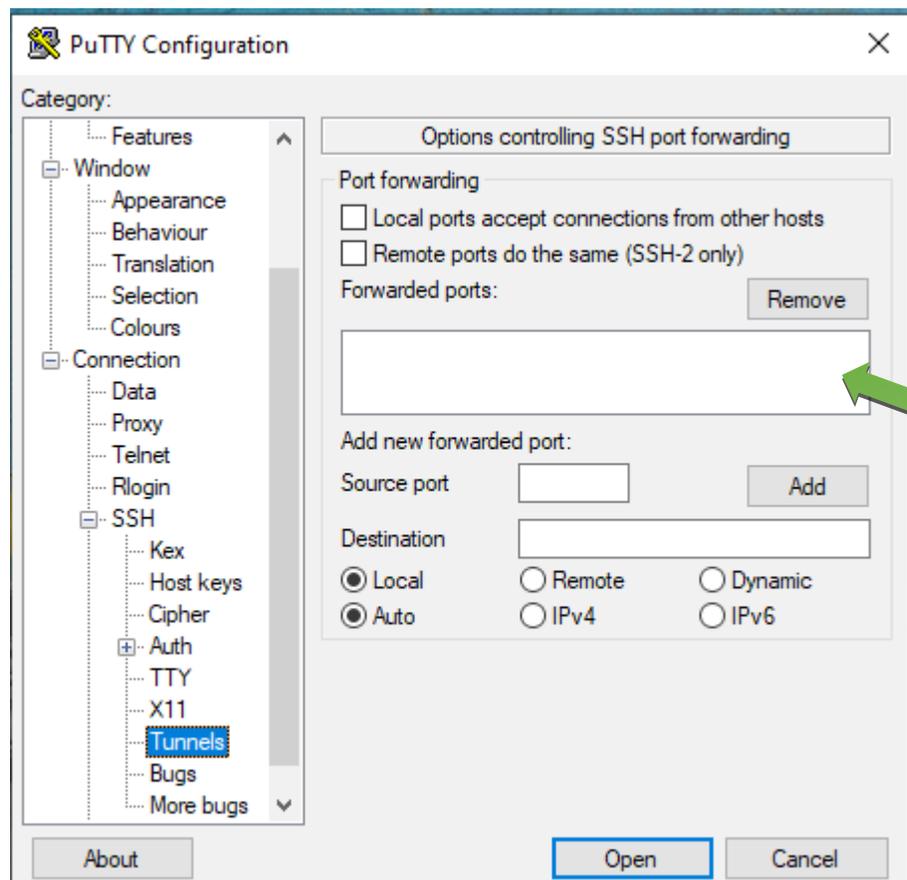
You will notice that the box in the middle as indicated above is empty.

Make the following entries.

a) Box to the right of Source port : 3391
b) Box to the right of Destination: **YOUR NBER PC's HOSTNAME.staff.nber.org**:3389
   The HOSTNAME is the one noted down in **a) of "What information would you need for the setup?"**

   Leave the button on "Local" and "Auto" as is.

See below for details:
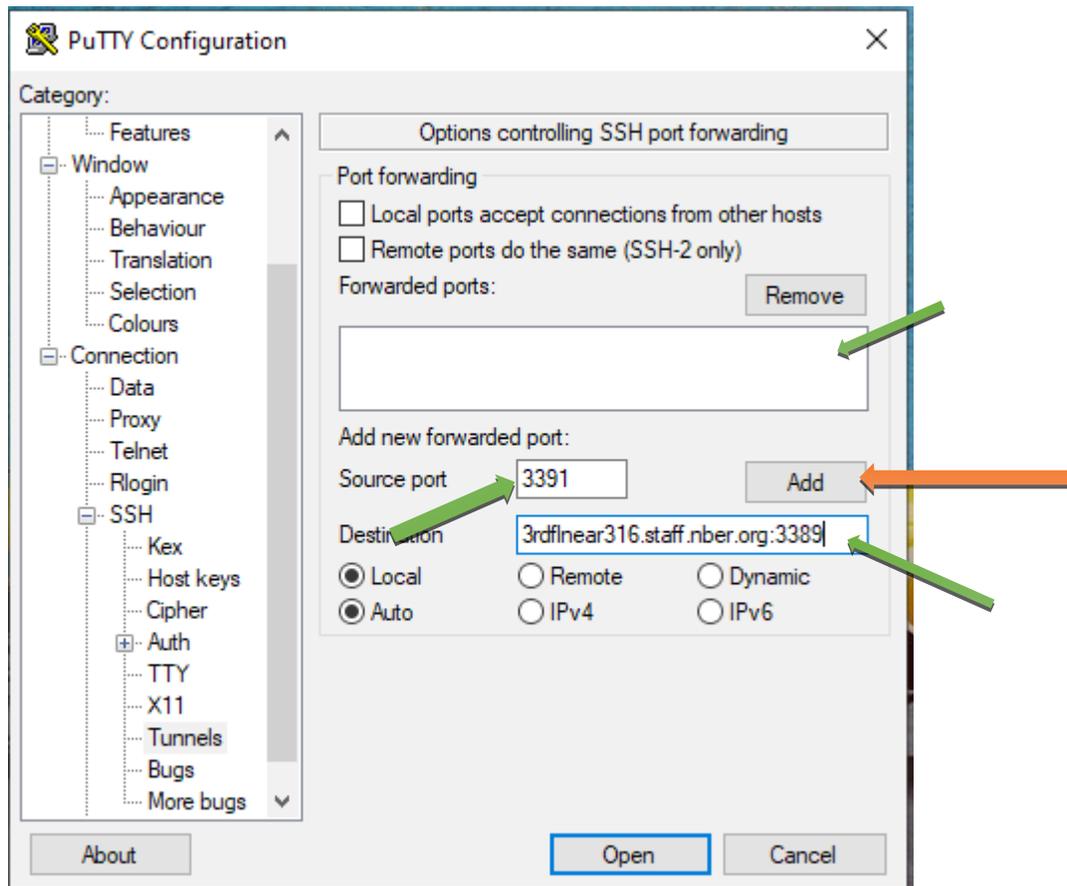
Click on "Add" as pointed in the orange arrow above. You will see the box in the middle filled thus:
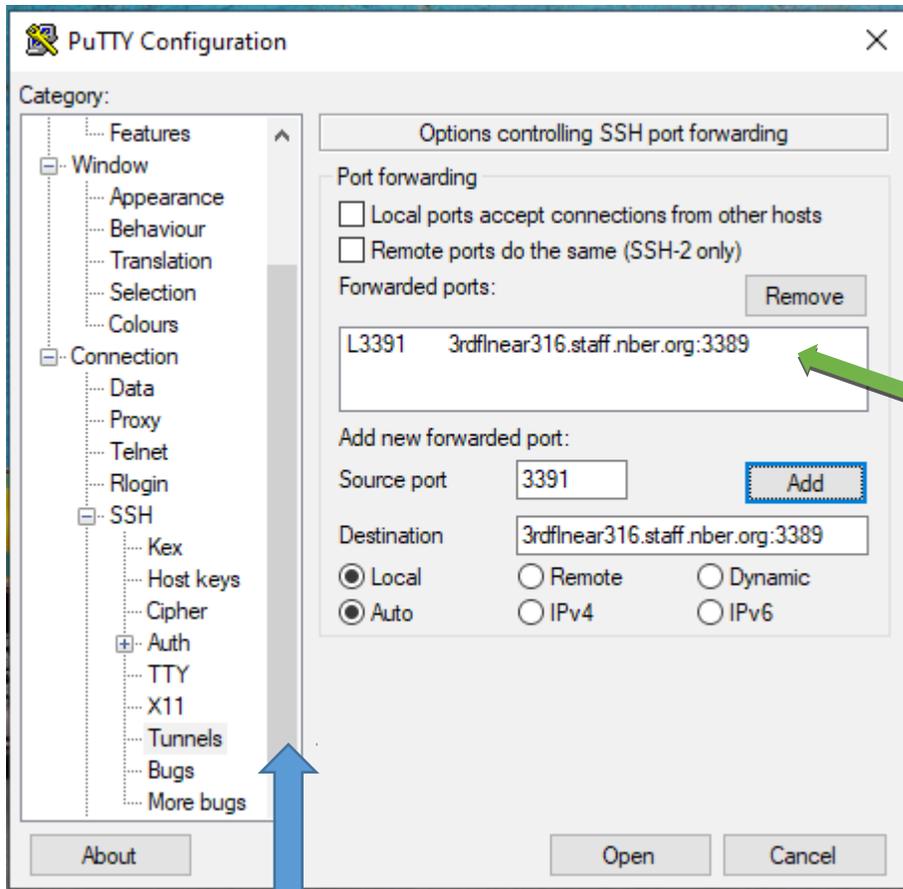
Use the scroll bar as show in the blue arrow above to move to the top. Click on "Session" under the categories (left part). The center menu under PuTTy also changes. You will see entries for "Host Name (or IP Address), and Saved sessions etc.

Here we are going to enter an NBER linux server hostname. As mentioned at the beginning (under Background), we are tunneling from your home PC via an NBER server to your NBER PC. This is the section for the NBER server.
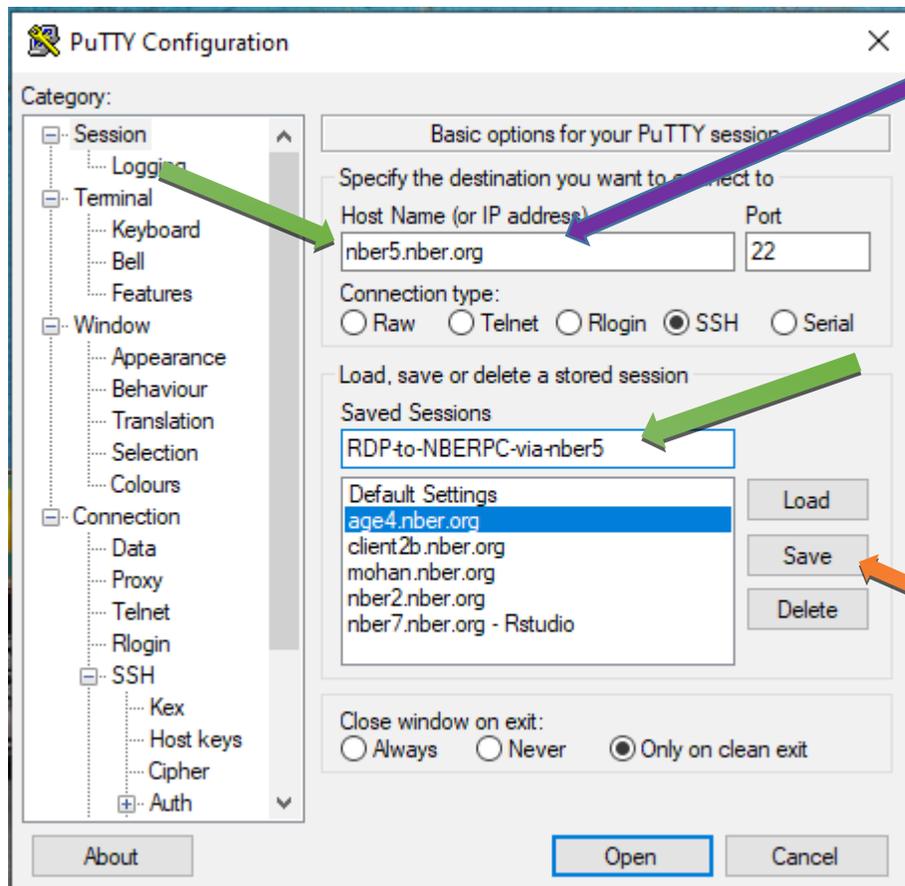
A special server has been set up for tunnel and is named tunnel.nber.org. Please choose this as the hostname. As a backup, you can use any of nber servers (nber0.nber.org ... nber9.nber.org). In this example, we choose **tunnel.nber.org** as shown in the first green arrow in the above picture. Next, in the box below "Saved session" enter anything you want Putty to remember these settings by. In our example we wrote: **"RDP-to-NBERPC-via-nber5"** as depicted in the 2nd green arrow. Finally, click on save as shown in the orange arrow.

Once you have saved this, the settings will remain and will be retained for future use as well. So these instructions are for **"one time"** setup only. You can now close your PuTTY screen.

Part 2: Remote Desktop

Now we are ready to login to your NBER Desktop. This is a 2 step process.

Step 1: Login to the ssh session to start the tunnel. Start PuTTY again by double clicking on the putty.exe or the Putty desktop icon.

In the center of the screen, you will see the name you gave for this saved session. Double click on it.
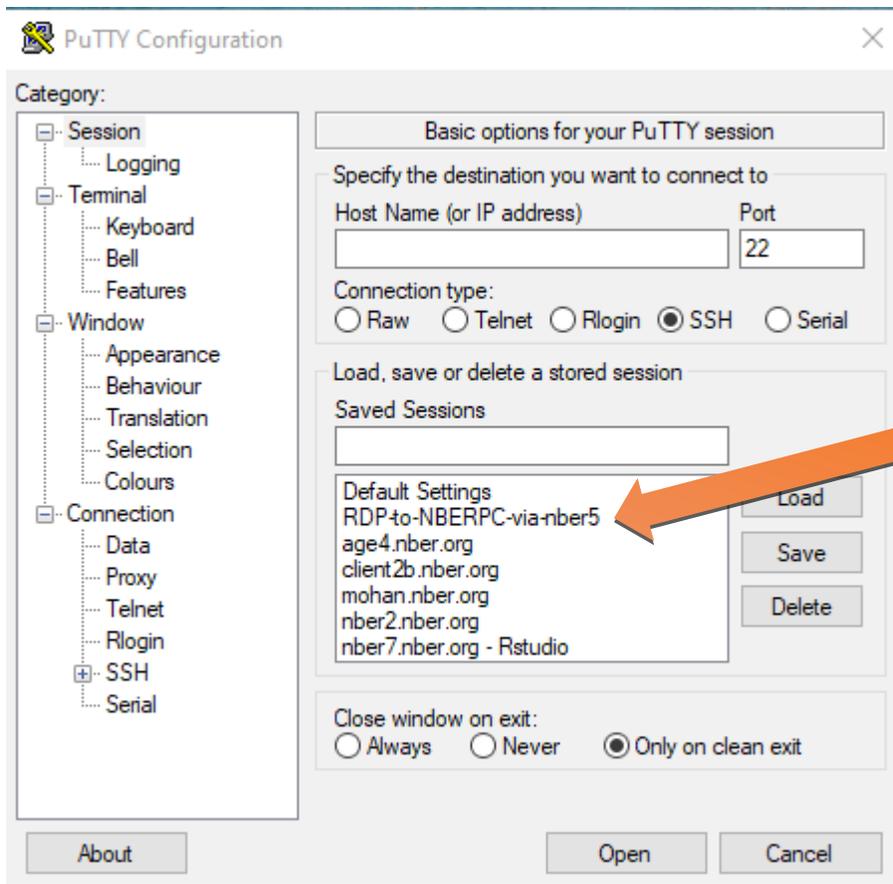
A new PuTTY ssh session window will open as below:

```
nber5.nber.org - PuTTY                                — □ ×
login as:
```
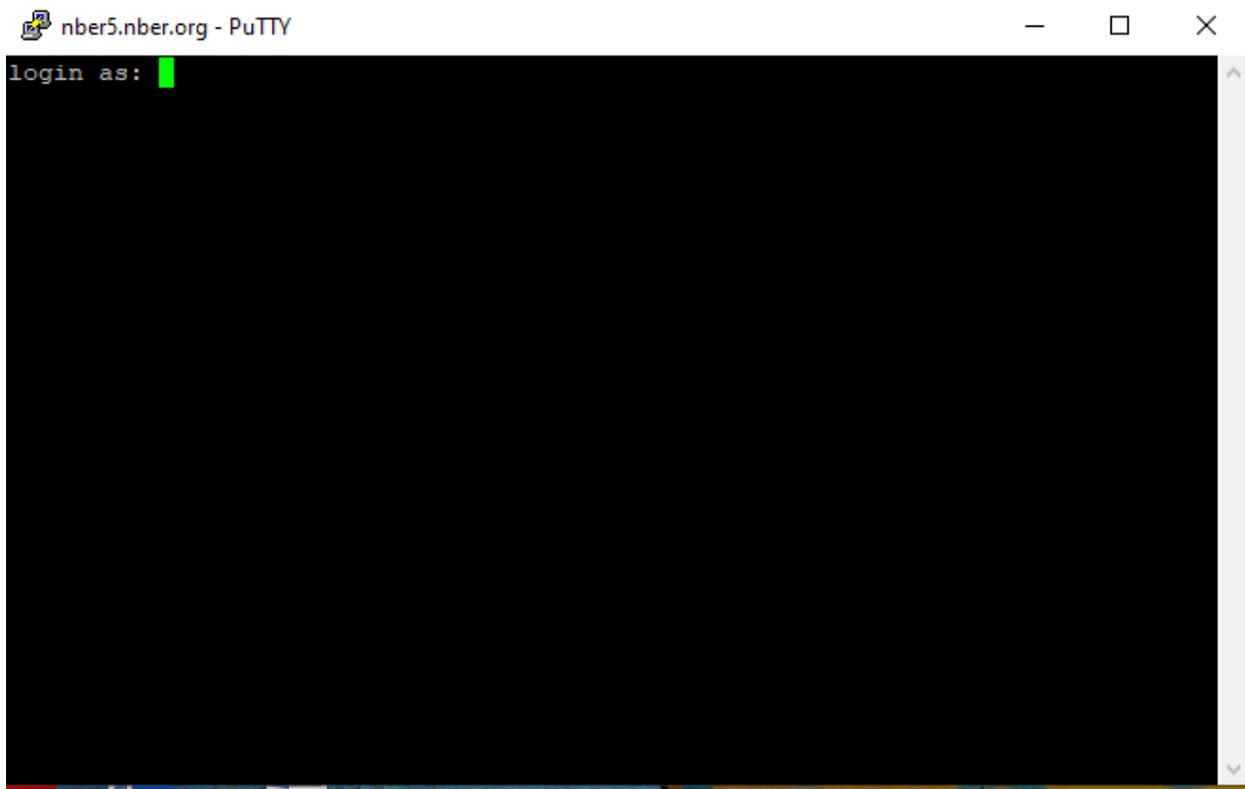
The first time you use this, PuTTy will ask whether you want to save server's(in our example nber5's) host key, and you want to answer "OK" to this. Use your nber server username (your NBER email account **sans @nber.org** part in the **"login as:"** prompt and hit enter. You will be prompted for your password. Enter your password. Please note that you will **not see the password you type on the screen, nor will you see the cursor moving.** This is normal, but your password is being entered.

Once you login, you will get a screen as below. Of course it will have your username instead:
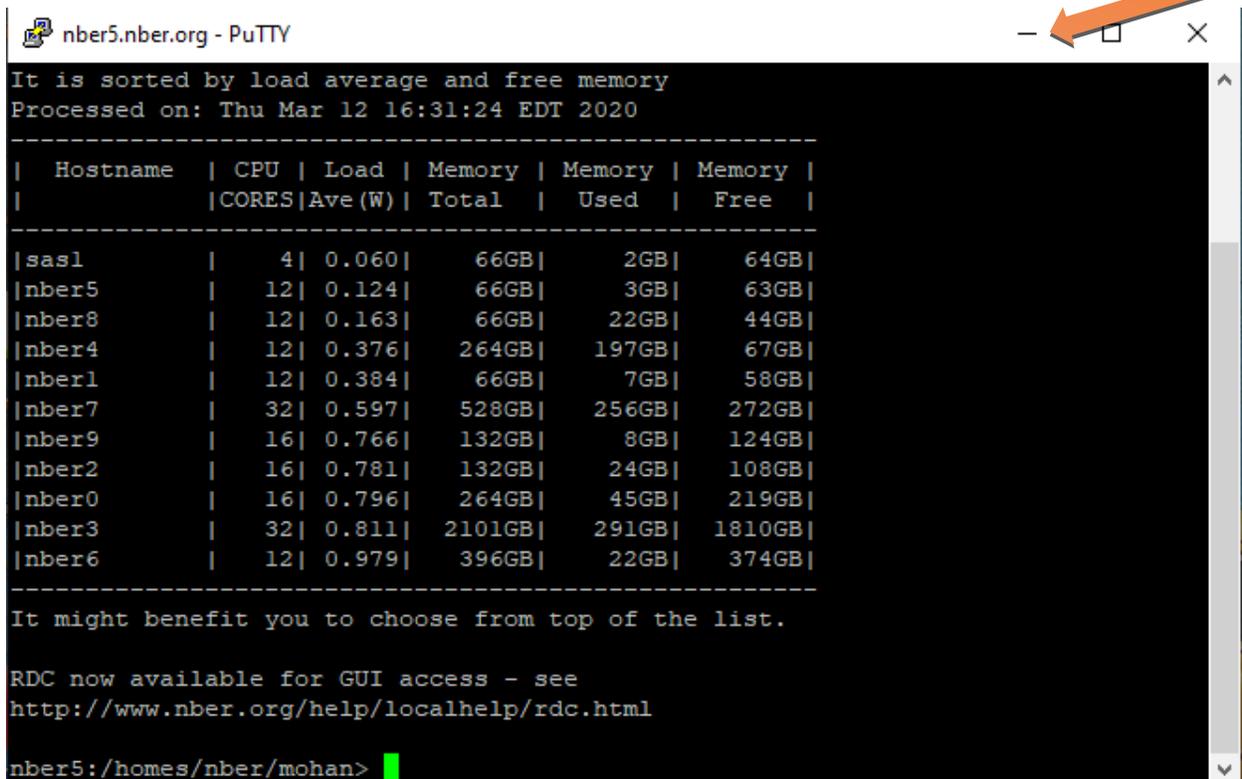

```
nber5.nber.org - PuTTY                                         —    □    ✕

It is sorted by load average and free memory
Processed on: Thu Mar 12 16:31:24 EDT 2020
---------------------------------------------------------------
|  Hostname  | CPU | Load | Memory | Memory | Memory |
|            |CORES|Ave(W)| Total  |  Used  |  Free  |
---------------------------------------------------------------
|sas1        |   4| 0.060|    66GB|     2GB|    64GB|
|nber5       |  12| 0.124|    66GB|     3GB|    63GB|
|nber8       |  12| 0.163|    66GB|    22GB|    44GB|
|nber4       |  12| 0.376|   264GB|   197GB|    67GB|
|nber1       |  12| 0.384|    66GB|     7GB|    58GB|
|nber7       |  32| 0.597|   528GB|   256GB|   272GB|
|nber9       |  16| 0.766|   132GB|     8GB|   124GB|
|nber2       |  16| 0.781|   132GB|    24GB|   108GB|
|nber0       |  16| 0.796|   264GB|    45GB|   219GB|
|nber3       |  32| 0.811|  2101GB|   291GB|  1810GB|
|nber6       |  12| 0.979|   396GB|    22GB|   374GB|
---------------------------------------------------------------
It might benefit you to choose from top of the list.

RDC now available for GUI access - see
http://www.nber.org/help/localhelp/rdc.html

nber5:/homes/nber/mohan> █
```

Minimize this PuTTy ssh session by clicking as pointed in the orange arrow above. **Note: Please do not close the session. The ssh tunnel via PuTTy is a prerquisite to connect via Remote Desktop.**

Step 2: Remote Desktop login.

Click on Start Menu at bottom left. Type the words "remote desktop" you will see:
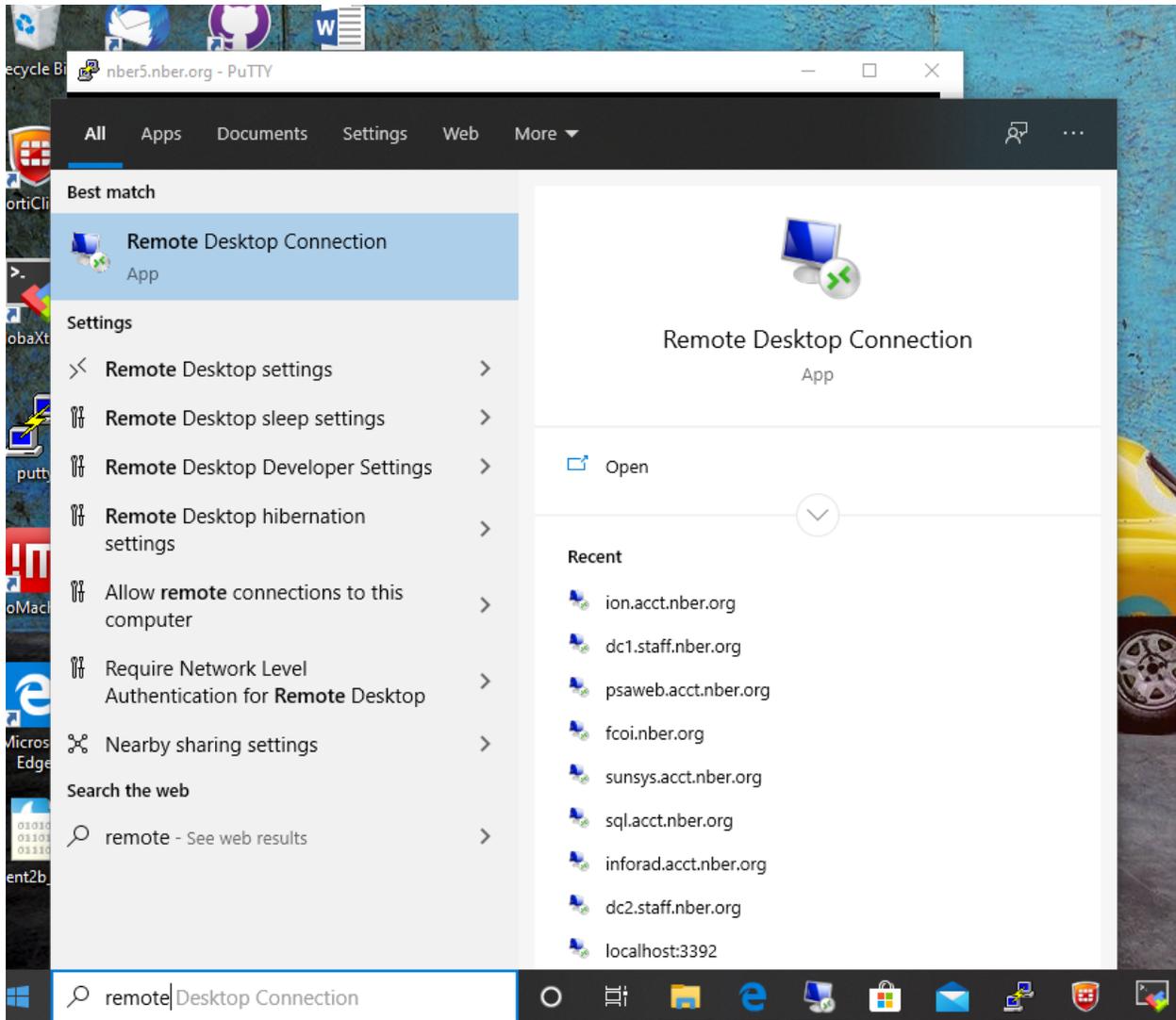
Choose Remote Desktop Connection which will take you to:
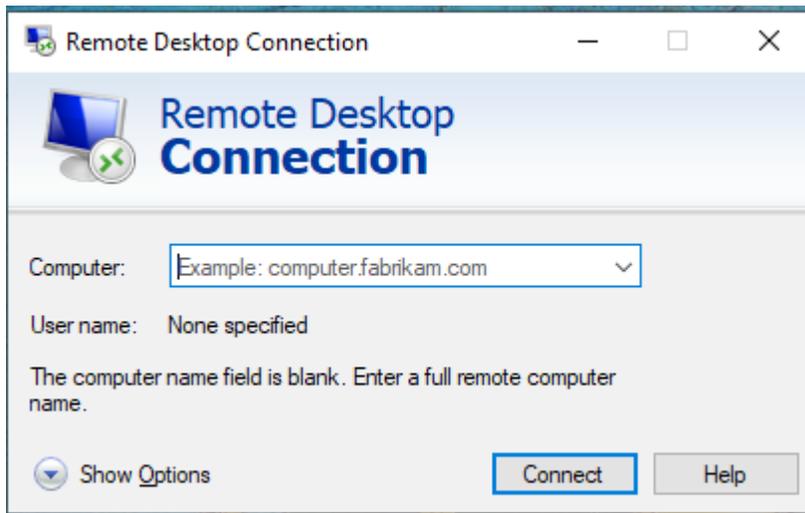
In the box for Computer enter localhost:3391 (no spaces between localhost, colon or 3391).
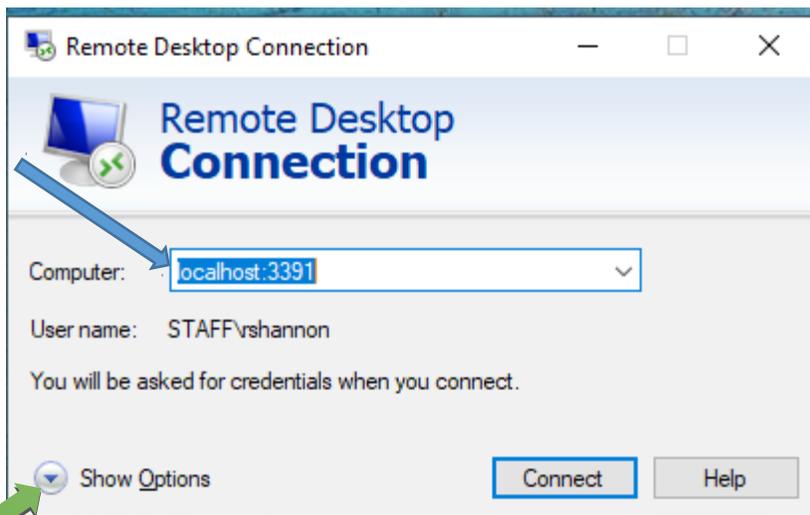
If you are using this for the first time, the User name: will not be entered, or will by your home PC's username. Click on Show Options, and you will see the below figure.
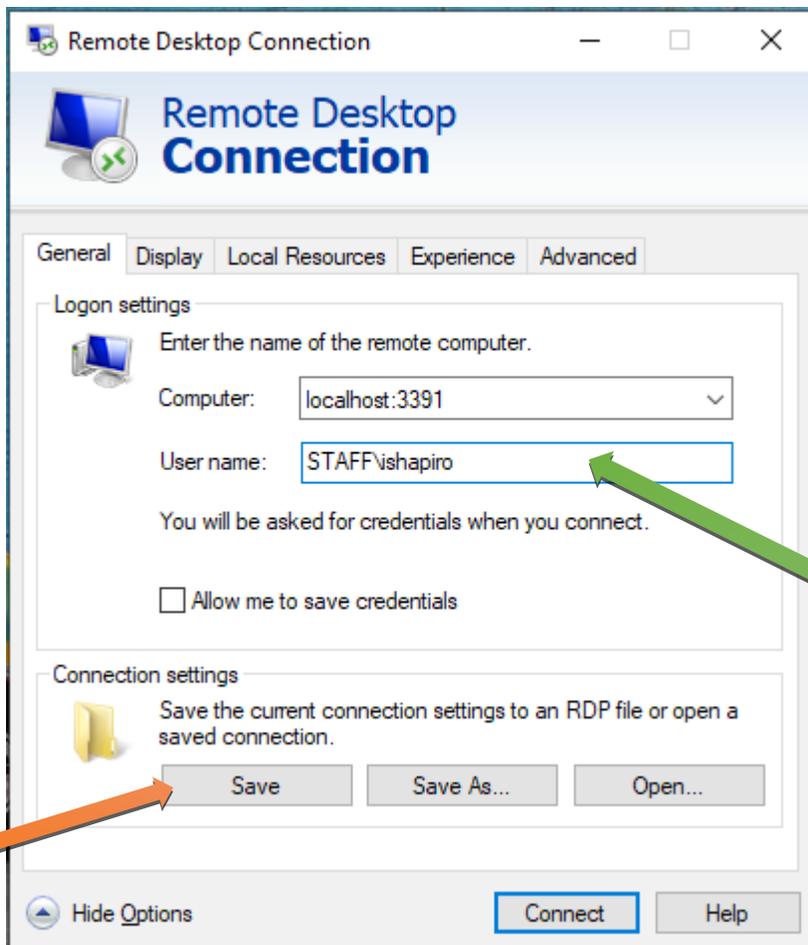
Enter the username STAFF**Your Username** and click save. This will save it for future sessions.

Click on Connect.

It will prompt you for your windows password, as below.
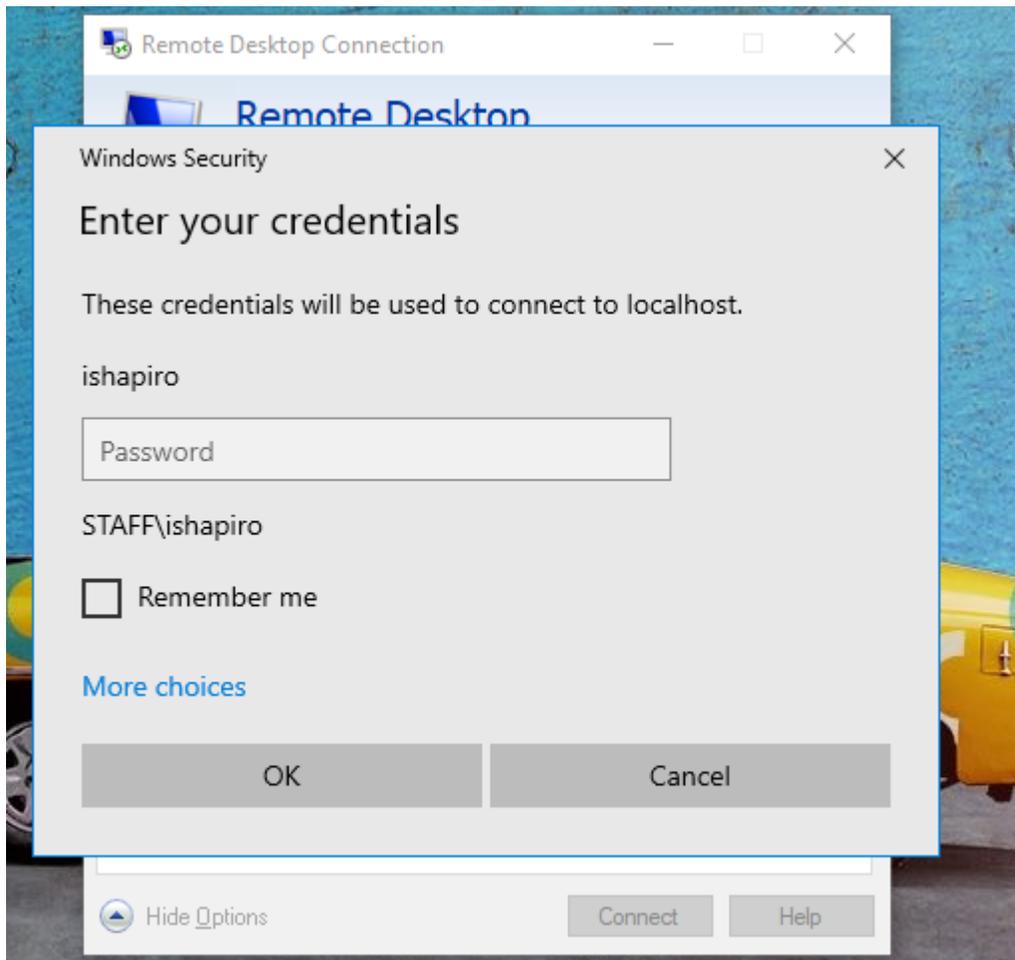
Once you enter your password, you will see your NBER Desktop PC's screen.

If you use full screen mode, this Remote Desktop Connection could appear very similar to your own home PC's Desktop. So you want to be careful which one you are operating on. For example intending to shut down your own home PC, you might click on "Start" ->Shutdown, but if you happen to be on RDC, you are in fact shutting down your NBER Desktop. In this event, you would need to call/email in NBER IT staff who would have to get into your office to physically power up your PC.

Also, do not try this on your NBER Desktop, otherwise it will be a cyclical even and nothing will work.

Troubleshooting options:

After going through all the steps if your connection still fails among others, there are 2 common problems to look at.

a) Whether your PuTTy ssh tunnel session is still active. Sometimes it drops, and you would want to reconnect.

b) If your ssh session is still all right, please contact NBER IT. A very useful item to present to IT is the screen shot that shows the tunnel setup. It is reproduced below.
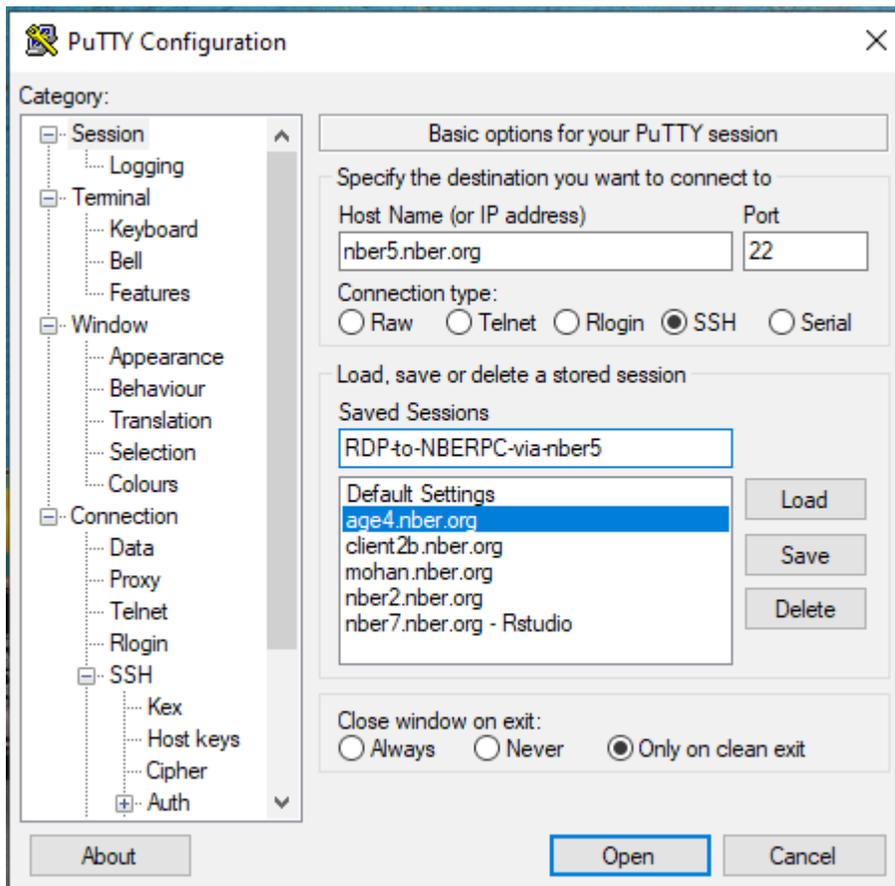
You can get to this screen, by opening PuTTy, click on the top left corner where the PuTTy icon symbol is displayed, scroll down to saved settings, and highlight your saved session. Then on the left panel expand(+) ssh, and click on "tunnel". This will give you the desired screen. Either send a picture of this screen to IT, or read it out for us.

Setup Using a Mac OS client.

The principle of tunnel is the same for a Mac Client as well. You would need 2 items for a Mac.

1) Microsoft Remote Desktop Client for a Mac. You can get this by first searching for it in Mac's finder or spotlight as shown in the figure below.

Click on the magnifying glass(search) image as shown in the above image. Type "Remote Desktop". You will either see the following screen , or offered to get Microsoft Remote Desktop application and install it from the app store.
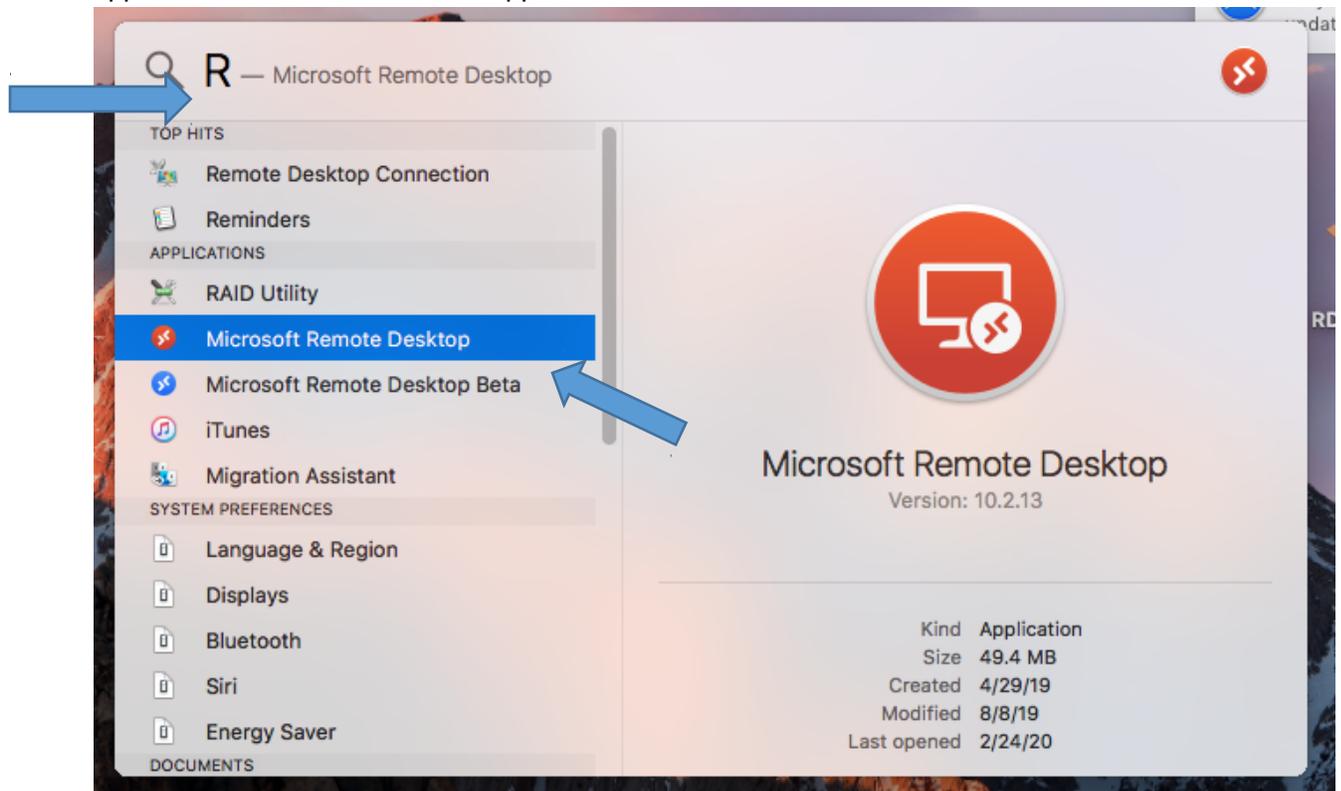
If you cannot get it from the app store, you can go to https://go.microsoft.com/fwlink/?linkid=868963 to get it. Install the software choosing all the defaults. Set this aside.

2) A "terminal" (A Mac is based on an underlying OS that is a UNIX variant) and it has an in-build ssh client. So you don't need PuTTy. A Mac Terminal is all you need. Again go to Spotlight search and locate "terminal" as shown below:
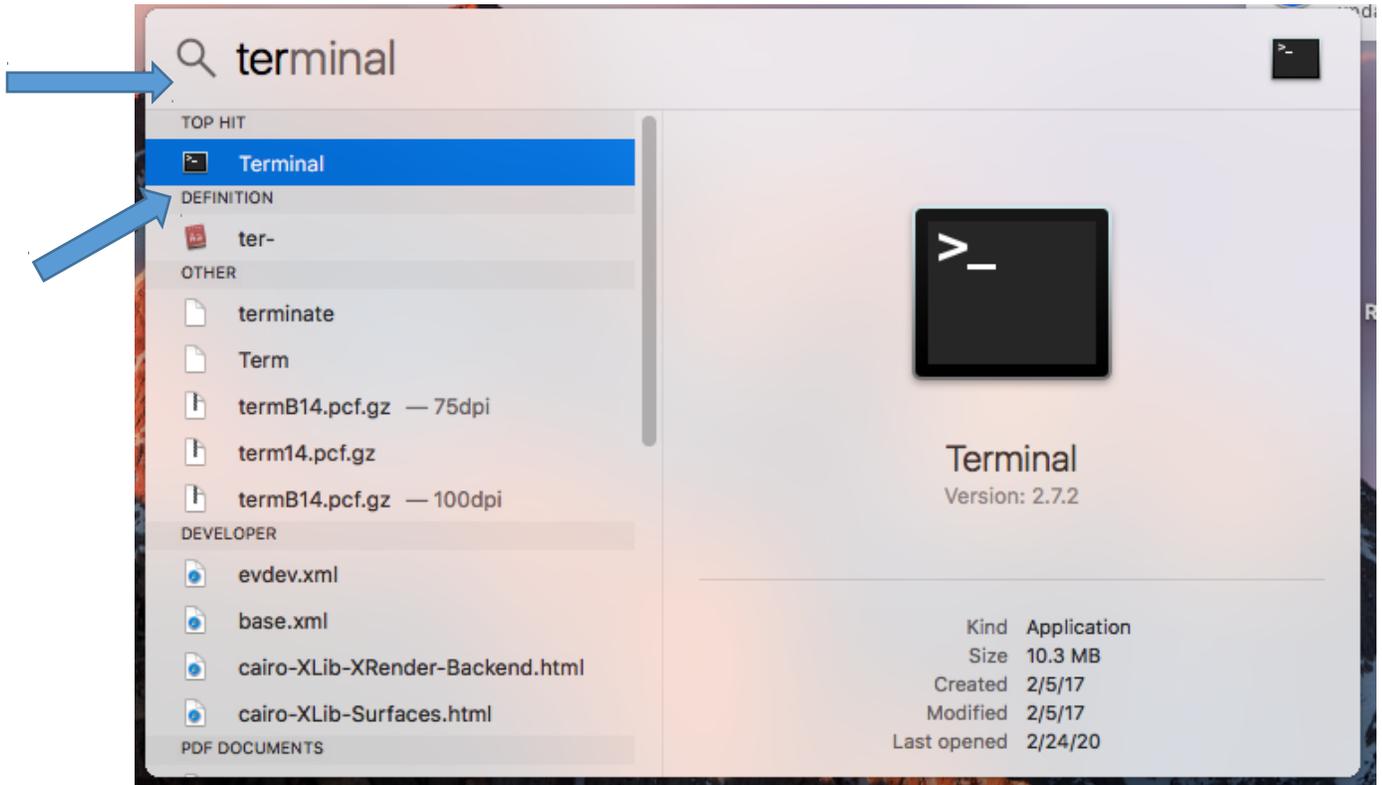
These are the only 2 times we need. Now we are ready to setup our Remote Desktop session.

Step 1: Make an ssh connection with a tunnel for the appropriate Remote Desktop ports using a Mac terminal. To do this, open terminal by double clicking on terminal when you find that in the spotlight search. From the terminal's command prompt enter the command:

ssh –L 3391:<your NBER PC hostname>.nber.org:3389 <your NBER email username>@nber5.nber.org

In our example,

> The NBER PC's hostname is 3rdflnear316.nber.org

> The username of your nber email address is mohan (NOT mohan@nber.org)

> The ssh server we chose is nber5.nber.org (one can choose any of nber0.nber.org … nber9.nber.org)

Collectively the command will look like;

Ssh –L 3391:3rdflnear316.staff.nber.org;3389 mohan@nber5.nber.org
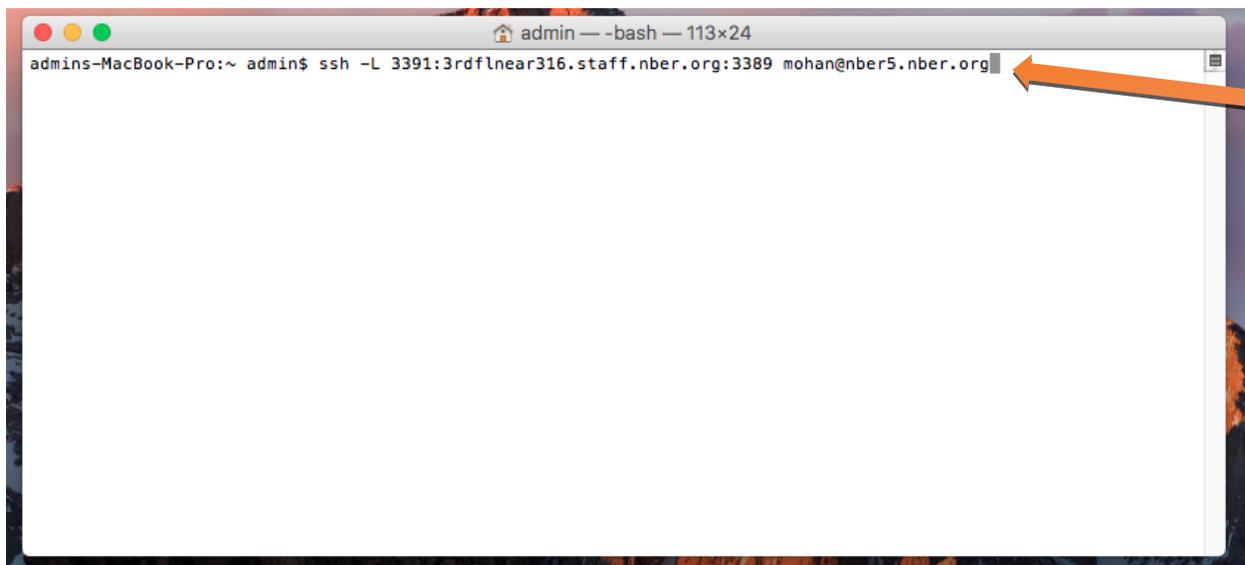
And when you press enter, the first time you will be asked to verify and save the ssh host key for nber server

```
admin — ssh -L 3391:3rdflnear316.staff.nber.org:3389 mohan@nber5.nber.org — 113×24
[admins-MacBook-Pro:~ admin$ ssh -L 3391:3rdflnear316.staff.nber.org:3389 mohan@nber5.nber.org
The authenticity of host 'nber5.nber.org (198.71.6.98)' can't be established.
ECDSA key fingerprint is SHA256:lxFUYzNfWvLSIifkIQQ8wzniM0MO4YCDWtmvMWTHMgQ.
Are you sure you want to continue connecting (yes/no)? yes
```

Answer "yes" and hit enter to proceed. You will then be prompted for your password. This is the password for your NBER server (email) account. A successful login will look like below;


```
admin — ssh -L 3391:3rdflnear316.staff.nber.org:3389 mohan@nber5.nber.org — 113×24
It is sorted by load average and free memory
Processed on: Mon Mar 16 15:11:25 EDT 2020
-------------------------------------------------------
|  Hostname  | CPU | Load | Memory | Memory | Memory |
|            |CORES|Ave(W)| Total  |  Used  |  Free  |
-------------------------------------------------------
|nber5       |  12| 0.000|   66GB|    2GB|   64GB|
|sas1        |   4| 0.003|   66GB|    2GB|   63GB|
|nber1       |  12| 0.003|   66GB|    7GB|   59GB|
|nber4       |  12| 0.018|  264GB|   21GB|  243GB|
|nber8       |  12| 0.235|   66GB|   24GB|   42GB|
|nber0       |  16| 0.535|  264GB|   35GB|  229GB|
|nber9       |  16| 0.561|  132GB|   17GB|  115GB|
|nber7       |  32| 0.581|  528GB|  327GB|  201GB|
|nber2       |  16| 0.636|  132GB|   27GB|  105GB|
|nber6       |  12| 0.655|  396GB|    7GB|  389GB|
|nber3       |  32| 1.547| 2101GB|  518GB| 1583GB|
-------------------------------------------------------
It might benefit you to choose from top of the list.

RDC now available for GUI access - see
http://www.nber.org/help/localhelp/rdc.html

nber5:/homes/nber/mohan>
```

This establishes the ssh tunnel. This is a prerequisite for establishing the Remote Desktop Connection.

Step 2: Make Remote Desktop connection.

Go back to spotlight, and search for Remote Desktop, and double click on "Microsoft Remote Desktop"

You will see the following screen.
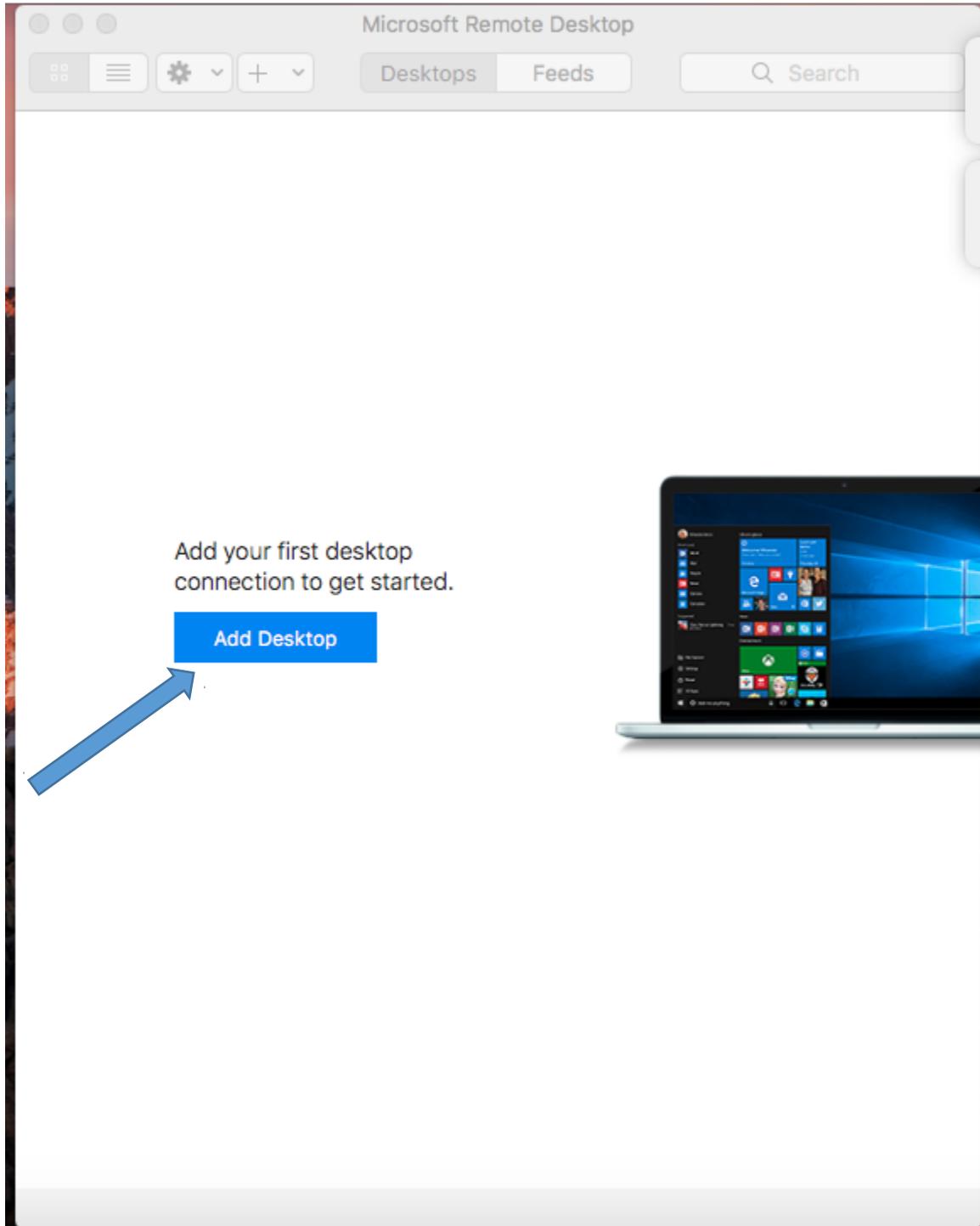
Click on Add Desktop. You will see the following screen
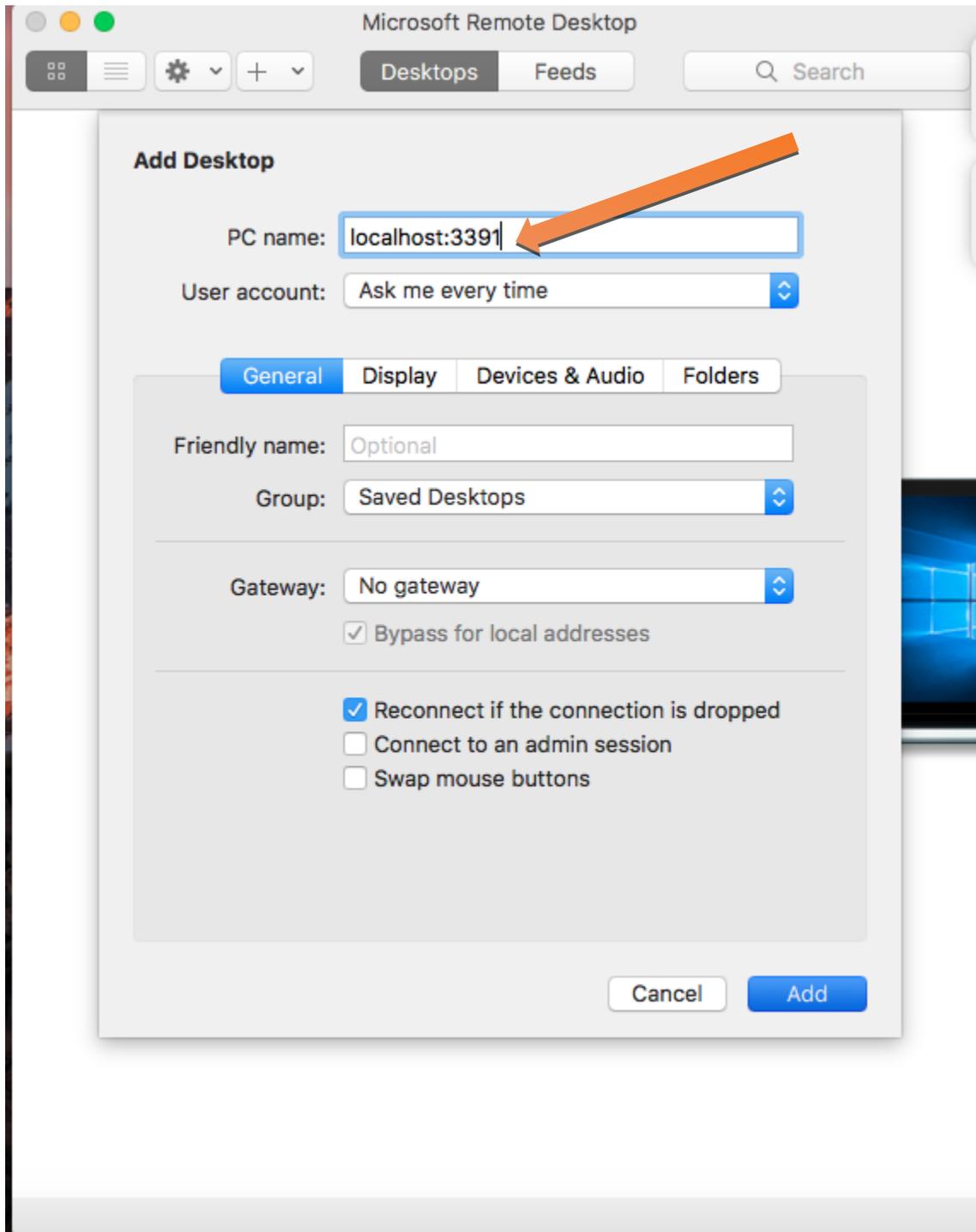
Enter localhost:3391 in the box for PC Name and click Add. This saves this setup and need not be entered again. Double click on this saved desktop.
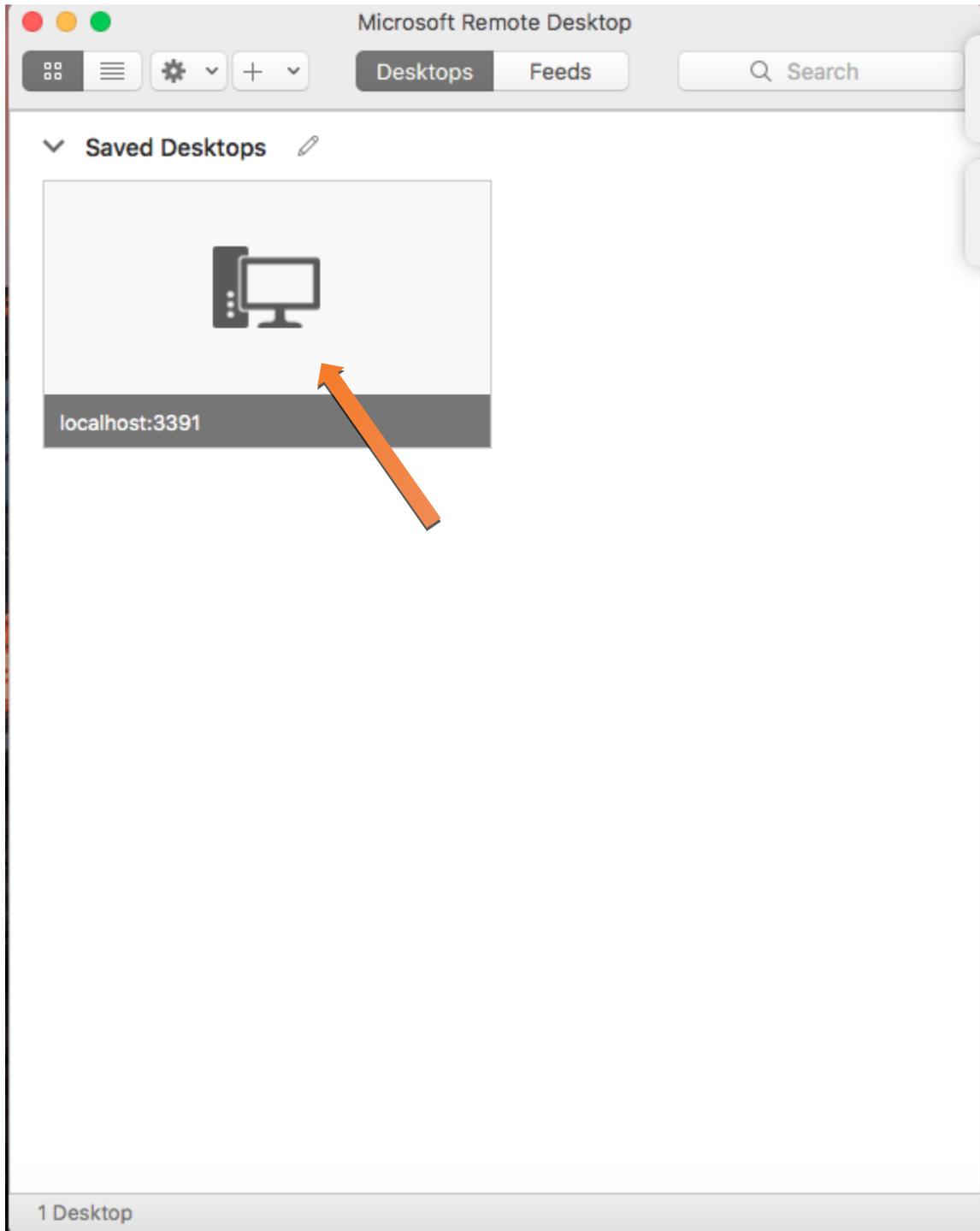
You will be prompted for username and password.

User the username STAFF\<your PC's username> and enter the password and click on continue.
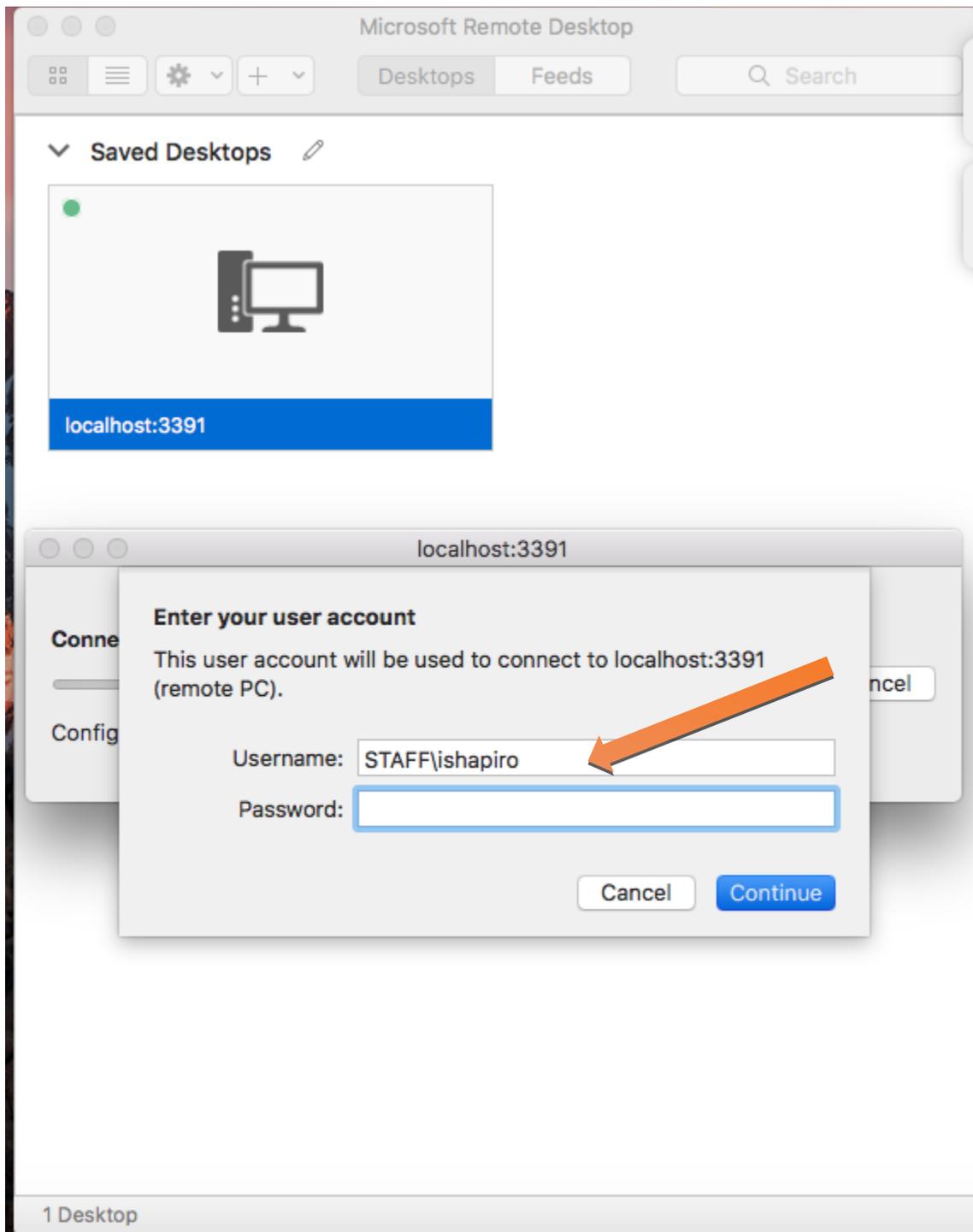
In our example the username is STAFF\ishapiro. You will be connected to your NBER PC now.

Following items are expected to be be rarely needed.

"Finding my NBER PC's IP address"

We need your NBER Desktop PC's hostname or IP address and not your home computer's.

On the bottom right hand corner of your NBER PC, click on the message center.
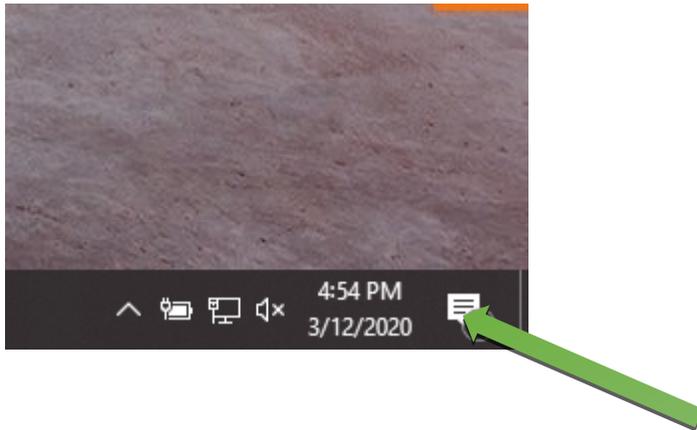
It will expand to as displayed below. Click on All settings.
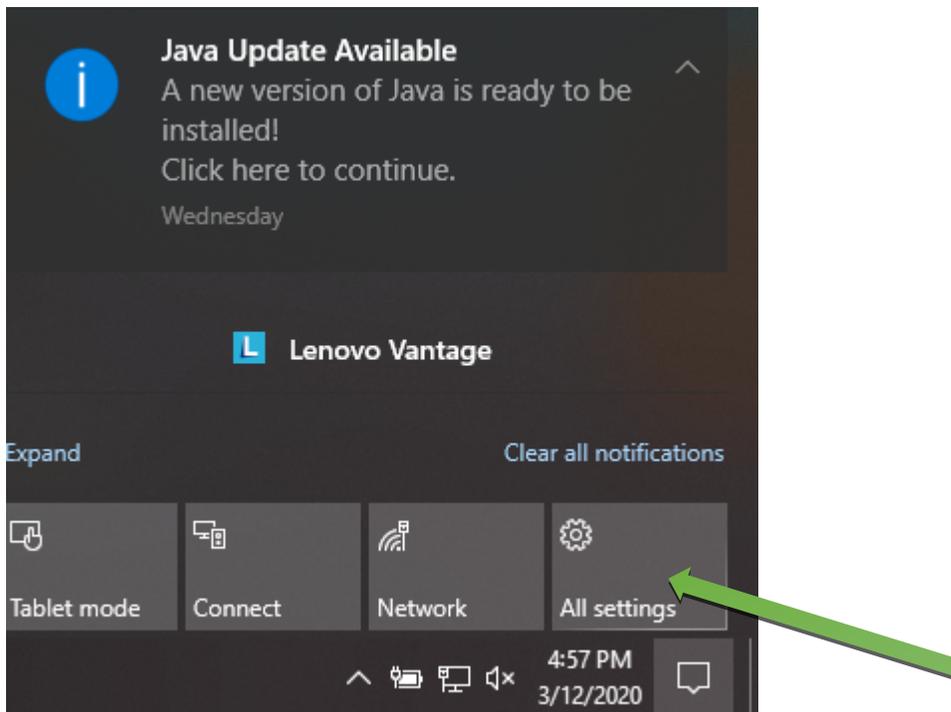
From there, click on Network and Internet, and further to Ethernet. On the right double click on "Network Connected" or whatever name you see for "connected" network. Scroll down to the "IP settings section, and that is where you will find your IP address. In case you are not given your hostname by NBER IT staff, replace the "hostname" (in our example 3rdflnear316.staff.nber.org) with the whatever IP you see here.

Below is an example (not your actual IP).

← Settings — □ ×

⌂ Network

setting for you to help you stay under your limit.

Set a data limit to help control data usage on this network

IP settings

IP assignment:	Manual
IPv4 address:	198.71.7.132
IPv4 subnet prefix length:	23
IPv4 gateway:	198.71.7.254
IPv4 DNS servers:	198.71.6.1
	198.71.6.3

Edit

Properties

Link-local IPv6 address:	fe80::9109:3db7:73c6:4f99%2
IPv4 address:	198.71.7.132
IPv4 DNS servers:	198.71.6.1
	198.71.6.3
Manufacturer:	Realtek

NBER PC's Allow RDP and Power Setting

For power settings, go back to "All Settings as above, and select System-> Power settings and make sure the NBER Desktop does not go in sleep mode.

To check if Remote Desktop access is enabled for your NBER Desktop, on the NBER desktop, click on Start, type "control panel." In the control panel, in the search box on the top right corner, type remote desktop.
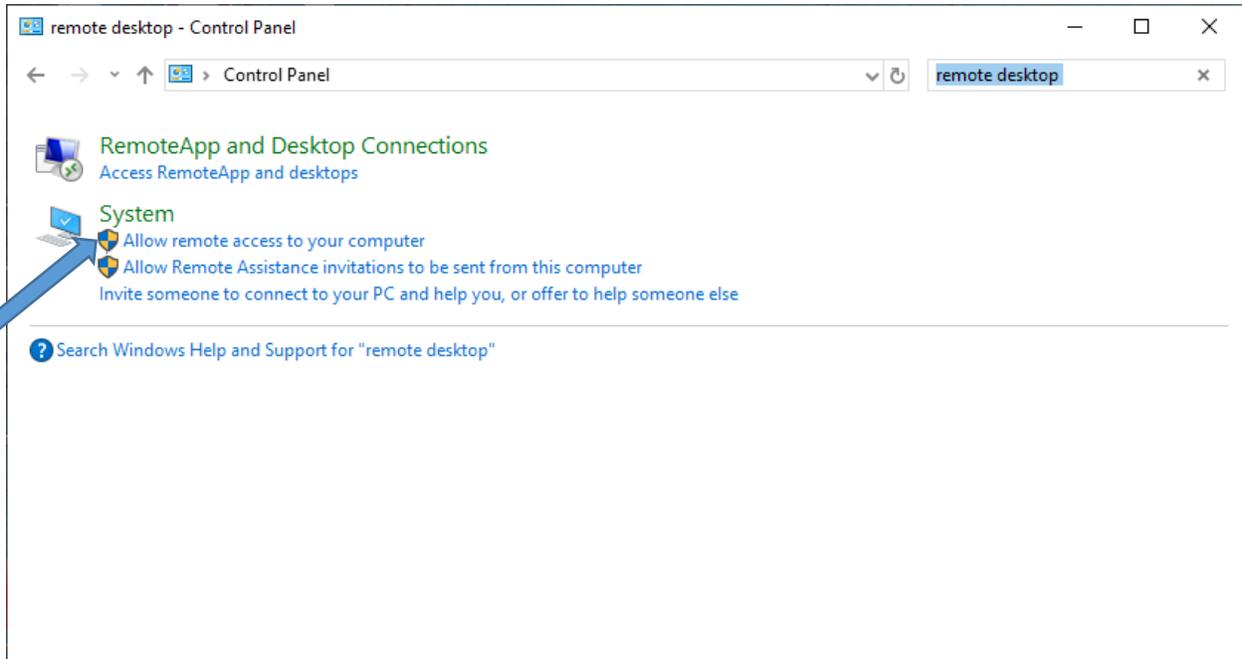
Click on Allow remote access to your computer. Make user it is enabled.