



Canadian Bioinformatics Workshops

www.bioinformatics.ca

bioinformaticsdotca.github.io

Supported by



Creative Commons

This page is available in the following languages:

Afrikaans Български Català Dansk Deutsch Ελληνικά English English (CA) English (GB) English (US) Esperanto
 Castellano Castellano (AR) Español (CL) Español (Ecuador) Castellano (MX) Castellano (PE)
 Euskara Suomeksi français français (CA) Galego עברית hrvatski Magyar Italiano 日本語 한국어 Macedonian Melayu
 Nederlands Norsk Sesotho sa Leboa polski Português română slovenščina čeština srpski (latinica) Sotho svenska
 中文 草語 (臺灣) isiZulu



Attribution-Share Alike 2.5 Canada

You are free:

-  to Share — to copy, distribute and transmit the work
-  to Remix — to adapt the work




Under the following conditions:

-  **Attribution.** You must attribute the work in the manner specified by the author or licensor (but not in any way that suggests that they endorse you or your use of the work).
-  **Share Alike.** If you alter, transform, or build upon this work, you may distribute the resulting work only under the same or similar licence to this one.

- For any reuse or distribution, you must make clear to others the licence terms of this work.
- Any of the above conditions can be waived if you get permission from the copyright holder.
- The author's moral rights are retained in this licence.

[Disclaimer](#)

Your fair dealing and other rights are in no way affected by the above.
 This is a human-readable summary of the Legal Code (the full licence) available in the following languages:
[English](#) [French](#)

[Learn how to distribute your work using this licence](#)



bioinformatics.ca



HPC4Health

Learning Objectives

- By the end of this lecture, you will:
 - Register your AWS Educate Starter account
 - Launch your AWS instance
 - Log into your AWS instance

AWS Educate Starter Account

- You should have finished this already!

Click the link to register

Hi -

Your educator has invited you to join AWS Educate and access a "Classroom" for your course work. A "Classroom" is a hands-on learning environment for you to access AWS services and practice AWS. There are no costs or fees to access a Classroom.

Classrooms are managed by a third-party content and service provider, Vocareum ("Third-Party Content Provider"), and use of the Classroom feature is governed by the Third-Party Content Provider's terms and conditions (including its Privacy Policy) in addition to the AWS Educate Terms and Conditions.

If you accept the Classroom invitation, the Third-Party Content Provider may allow your educator to view your Classroom account and activity, including the AWS console in your Classroom account, the number of EC2 instances running and any Content running in the services, and your access activity.

Click [here](#) to complete the AWS Educate application process, accept your Classroom invitation and receive access to program benefits, including cloud career learning pathways, access to AWS resources and promotional credit through the AWS Educate Starter Account, and access to the AWS Educate Job Board, where applicable.

Please apply using the link above to accept this invitation. If you do not wish to proceed, ignore this email.

Thank you,

AWS Educate

Fill in your information

McGill University

Preferred Language:

English

Start typing the name of your school and select from the list. If you don't see your school, enter the full name, example: Harvard University

First Name

Country

zhibin@gmail.com

Last Name

Graduation Month

Graduation Year

Birth Month

Birth Year

Promo Code (optional)

Please click the box below to help assure that a person and not an automated program is submitting this application. If a set of letters is displayed enter them on the line. If you have any difficulty with the letters, you can click the reload icon to get a new set of letters, or click the headphones to hear audio of what to enter.

I'm not a robot

reCAPTCHA
Privacy · Terms

Please note that any personal information you provide will be treated in accordance with the [AWS Educate Terms and Conditions](#) and [AWS Privacy Notice](#)

NEXT



agree to the “Terms and Conditions”

Terms & Conditions

Preferred Language: English 

AWS EDUCATE TERMS AND CONDITIONS

(Last Updated April 30, 2019)

1.0 YOUR AGREEMENT WITH AWS

1.1 This Agreement. This set of terms and conditions (this “**Agreement**”) is an agreement between you (or the Entity you work for) (“**you**”) and Amazon Web Services, Inc. or other entity noted in Section 10 (in either case, “**AWS**”, “**we**”, or “**us**”). This Agreement governs your participation in the AWS Educate Program (the “**Program**”) described at <https://aws.amazon.com/education/awseducate/> and its subpages (the “**Program Site**”), including (a) your use and submission of data, text, audio, video, images, software (including machine images), or other materials (collectively, “**Content**”) in connection with the Program; and (b) your use of any tools, websites, and services AWS may provide to you in connection with the Program (collectively, the “**Educate Tools**”). If you are entering into this Agreement for a commercial entity, government institution, or any other entity (“**Entity**”), such as the company or educational institution you work for, you represent that you have legal authority to bind that Entity, and references to “**you**” in this Agreement will be deemed as referring to that Entity. If you have an AWS Customer Agreement (available at <http://aws.amazon.com/agreement/>) or other agreement between you and AWS governing your use of AWS services (“**AWS Services Agreement**”), that agreement will govern your use of the web services described in the Service Terms of the agreement and any other Service Offerings covered by (and as defined) therein.

1.2 Agreement with AWS BY CLICKING “I ACCEPT” OR ACCEPTING PROGRAM BENEFITS (AS DEFINED BELOW) YOU ARE ENTERING INTO A LEGALLY BINDING CONTRACT.

You must scroll through the entire Terms and Conditions before accepting or declining.

I Agree I Decline

SUBMIT 

Click the link to verify your email address

Email Verification - AWS Educate Application

↶ ↲ →

Today at 11:06 AM



○ AWS Educate Support <support@awseducate.com>

To: ○ zhibin@gmail.com

Hello [REDACTED],

Thank you for submitting your AWS Educate application!

In order for your AWS Educate application to be processed, we need to verify your email address. Please use the verification URL below to confirm your email address and complete the application process.

[https://www.awseducate.com/ConfirmEmail?ref=\[REDACTED\]](https://www.awseducate.com/ConfirmEmail?ref=[REDACTED])

Thank you,

The AWS Educate Team



Apply to join AWS Educate

Your email has been verified!
We'll review your application
shortly. Check your email for
status updates as we process
your application.

Click the link to set your password

AWS Educate Application Approved



○ AWS Educate Support <support@awseducate.com>

To: ○ zhibin@gmail.com

← ↵ →

Today at 11:10 AM

Dear Zhibin,

Congratulations!

Your AWS Educate application has been approved. As a member of the AWS Educate program, you will gain access to the benefits listed below:

AWS Educate Student Portal

The AWS Educate Student Portal is the hub for AWS Educate students around the world to find AWS content to help with classwork, connect to self-paced labs and training resources.

Click here to set your password and log in to the AWS Educate Student Portal.

Bookmark the AWS Educate Student Portal for easy access, or click here to sign in directly.

You can access a video walk-through of the AWS Educate Student portal here.

Free AWS Essentials Training

To access our foundational AWS Cloud Practitioner Essentials online learning class for free and find other self-paced labs, you must have either an AWS account or an Amazon ID.

- If you have an AWS account, sign in and click here to receive these benefits.

Click “AWS Account” after you log in

My Classrooms Portfolio Career Pathways Badges Jobs▼ **AWS Account** Logout

Create your Educate Starter Account

I'd like to use an AWS Educate Starter Account

Choose an AWS Educate Starter Account to get access to an AWS account with a preset limit on your spend on AWS services. An AWS Educate Starter Account is run and managed by a third party (Vocareum, Inc.) and the Starter Account runs in Vocareum's environment on AWS. Starter Accounts are subject to a separate agreement between you and Vocareum under separate terms and conditions.

The AWS Educate Starter Account provides access to most but not all AWS services. Students at an AWS Educate member institution will receive up to \$100 (USD) of AWS credit per year in their AWS Educate Starter Account, and students at non-member institution will receive up to \$30 (USD) of AWS credit per year.

You don't need a credit card to use a Starter Account because AWS promotional credits are already available in the account. When your usage of AWS services exceeds the balance on the account, the account is closed and any running services or other resources on the account are lost.

[Create Starter Account](#)

AWS Educate Starter Account

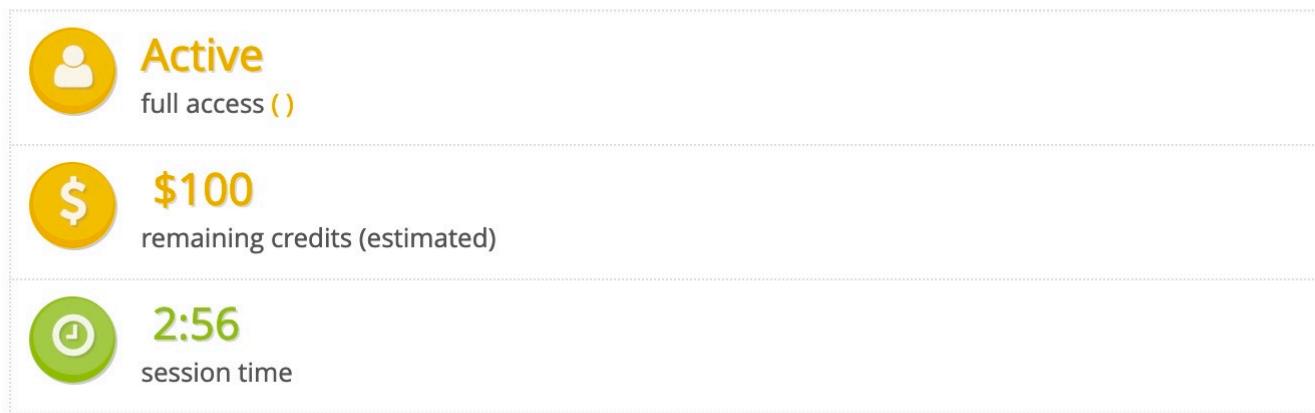
Your cloud journey has only just begun. Use your AWS Educate Starter Account to access the AWS Console and resources, and start building in the cloud!

[AWS Educate Starter Account](#)

Your account has an estimated **100** credits remaining and access will end on **May 18, 2022**.

AWS Educate Starter Account

Your AWS Account Status



Account Details

AWS Console

Please use AWS Educate Account responsibly. Remember to shut down your instances when not in use to make the best use of your credits. And, don't forget to logout once you are done with your work!

Launch AWS EC2 Instance

- AWS Educate Starter account
- URL:
<https://aws.amazon.com/education/awseducate/>

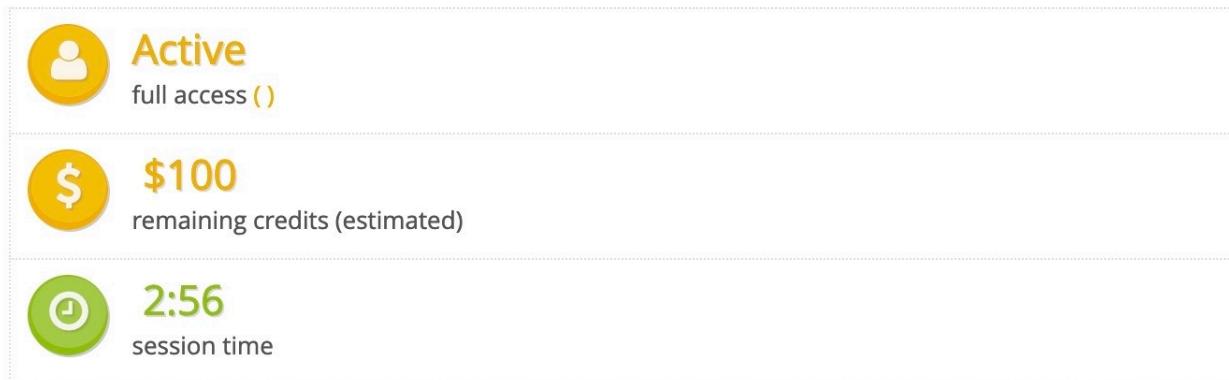
Go to the classroom

The screenshot shows the AWS Educate dashboard. At the top, there is a navigation bar with the AWS Educate logo, user profile (Zhibin Lu), and various menu items: My Classrooms, Portfolio, Career Pathways, Badges, Jobs, AWS Account, and Logout. A red box highlights the 'My Classrooms' tab. Below the navigation bar, there are user statistics: Consecutive Days: 1, Pathways Completed: 0, and Badges Earned: 0. A dropdown menu for Preferred Language is set to English. The main content area is titled 'My Classrooms' in orange. It contains a sub-instruction: 'View your list of Classroom invitations and accept or decline the invitation. Access a Classroom by clicking Go to my classroom.' A table lists classroom invitations with columns: Course Name, Description, Educator, Course End Date, Credit Allocated Per Student, and Status. One row for 'Cancer Analysis' is shown, with details: Cancer research has rapidly embraced high throughput technologies and Cloud computing into its research. Large amounts of data are being created from various microarray, tissue array, and next generation sequencing platforms. This 5-day workshop will cover the key bioinformatics concepts and tools required to analyze cancer genomic data sets and access and work with data sets in the Cloud. Educator: Francis Ouellette, Course End Date: 06/12/2021, Credit Allocated Per Student: \$100, Status: Accepted. A blue button labeled 'Go to classroom' with a right-pointing arrow is highlighted with a red arrow.

Course Name	Description	Educator	Course End Date	Credit Allocated Per Student	Status
Cancer Analysis	Cancer research has rapidly embraced high throughput technologies and Cloud computing into its research. Large amounts of data are being created from various microarray, tissue array, and next generation sequencing platforms. This 5-day workshop will cover the key bioinformatics concepts and tools required to analyze cancer genomic data sets and access and work with data sets in the Cloud.	Francis Ouellette	06/12/2021	\$100	Accepted

Go to AWS Console

Your AWS Account Status



Account Details

AWS Console



Please use AWS Educate Account responsibly. Remember to shut down your instances when not in use to make the best use of your credits. And, don't forget to logout once you are done with your work!

Access EC2 service

The screenshot shows the AWS Management Console interface. At the top, there is a navigation bar with the AWS logo, a 'Services' button (which is highlighted with a red box and has a downward arrow icon), a search bar containing the placeholder text 'Search for services, features, marketplace products, and docs', and a keyboard shortcut '[Option+S]'. To the right of the search bar are icons for notifications and user authentication, followed by the URL 'vocstartsoft/user1450783=zhibin@g...'. On the left side, there is a sidebar with sections for 'Favorites' (Resource Groups & Tag Editor) and 'Recently visited' (Console Home, EC2, S3). The main content area is titled 'All services' and lists various AWS services. A red arrow points to the 'EC2' service entry, which is under the 'Compute' category. Other visible services include Lambda, Batch, Elastic Beanstalk, Serverless Application Repository, AWS Outposts, EC2 Image Builder, AWS App Runner, Customer Enablement, AWS IQ, Support, Managed Services, Activate for Startups, Blockchain, Amazon Managed Blockchain, Satellite, Ground Station, Quantum Technologies, and several services under the 'Machine Learning' category (Amazon SageMaker, Amazon Augmented AI, Amazon CodeGuru, Amazon DevOps Guru, Amazon Comprehend, Amazon Forecast, Amazon Fraud Detection, Amazon Kendra, Amazon Lex, Amazon Personalize, Amazon Polly, and Amazon Rekognition).

aws Services ▾ Search for services, features, marketplace products, and docs [Option+S]

vocstartsoft/user1450783=zhibin@g...

Favorites

Resource Groups & Tag Editor

Recently visited

Console Home
EC2
S3

All services

- Compute
 - EC2
 - Lambda
 - Batch
 - Elastic Beanstalk
 - Serverless Application Repository
 - AWS Outposts
 - EC2 Image Builder
 - AWS App Runner
- Customer Enablement
 - AWS IQ
 - Support
 - Managed Services
 - Activate for Startups
- Blockchain
 - Amazon Managed Blockchain
- Satellite
 - Ground Station
- Quantum Technologies

Storage

- S3

Machine Learning

- Amazon SageMaker
- Amazon Augmented AI
- Amazon CodeGuru
- Amazon DevOps Guru
- Amazon Comprehend
- Amazon Forecast
- Amazon Fraud Detection
- Amazon Kendra
- Amazon Lex
- Amazon Personalize
- Amazon Polly
- Amazon Rekognition

Launch an AWS EC2 Instance

Savings Plans

Reserved Instances New

Dedicated Hosts

Scheduled Instances

Capacity Reservations

Images

AMIs

Elastic Block Store

Volumes

Snapshots

 Easily size, configure, and deploy Microsoft SQL Server with the AWS Launch Wizard for SQL Server. [Learn more](#)

Launch instance

To get started, launch an Amazon EC2 instance, which is a virtual machine.

Launch instance ▾



Note: Your instances will launch in the US East (N. Virginia)

Click “Community AMI” and type “CBW” to search and then Select the correct AMI

Step 1: Choose an Amazon Machine Image (AMI)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. You can select an AMI provided by AWS, our user community, or the AWS Marketplace; or you can select one of your own AMIs.

The screenshot shows the AWS Lambda console interface. A search bar at the top contains the text "cbw". A red box highlights the "Community AMIs (1)" link in the left sidebar. Another red box highlights the search bar. On the right, a list of AMIs is shown, with the first item being "CBW_210531 - ami-00a7bf508509ee4de". To the right of this item is a "Select" button, which has a red arrow pointing to it. Below the AMI list, there is a note about results found in other catalogs, mentioning "9 results in AWS Marketplace".

Find m5 types and check m5.xlarge

Step 2: Choose an Instance Type

Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are virtual servers capacity, and give you the flexibility to choose the appropriate mix of resources for your applications. [Learn more](#) about i

Filter by: **m5** ▾ Current generation ▾ Show/Hide Columns

Currently selected: m5.xlarge (- ECUs, 4 vCPUs, 3.1 GHz, -, 16 GiB memory, EBS only)

	Family	Type	vCPUs	Memory (GiB)	Instance
<input type="checkbox"/>	m5	m5.large	2	8	
<input checked="" type="checkbox"/>	m5	m5.xlarge	4	16	
<input type="checkbox"/>	m5	m5.2xlarge	8	32	

Select an existing security group if you launched instances before, otherwise create a new one. Make sure add rules to allow port 80 and 8080

Step 6: Configure Security Group

A security group is a set of firewall rules that control the traffic for your instance. On this page, you can add rules to allow specific traffic to reach your instance. For example, if you want traffic to reach your instance, add rules that allow unrestricted access to the HTTP and HTTPS ports. You can create a new security group or select from an existing one below. [Learn more](#)

- Assign a security group: Create a new security group
 Select an existing security group

Security group name:

launch-wizard-2

Description:

launch-wizard-2 created 2021-05-31T23:27:23.044-04:00

Type	Protocol	Port Range	Source
SSH	TCP	22	Custom 0.0.0.0/0
Custom TCP F	TCP	80	Custom CIDR, IP or Security Group
Custom TCP F	TCP	8080	Custom 0.0.0.0/0, ::/0
Add Rule			

You can use the existing key or create a new key.

IMPORTANT! Make sure you download the key and save to a place you can find.

Select an existing key pair or create a new key pair

X

A key pair consists of a **public key** that AWS stores, and a **private key file** that you store. Together, they allow you to connect to your instance securely. For Windows AMIs, the private key file is required to obtain the password used to log into your instance. For Linux AMIs, the private key file allows you to securely SSH into your instance.

Note: The selected key pair will be added to the set of keys authorized for this instance. Learn more about [removing existing key pairs from a public AMI](#).

Create a new key pair

Key pair name

CBW

 Download Key Pair



You have to download the **private key file** (*.pem file) before you can continue. **Store it in a secure and accessible location.** You will not be able to download the file again after it's created.

 Cancel

Launch Instances

Click “View Instances” to see the instance



Your instances are now launching

The following instance launches have been initiated: [i-03a86372dbaafdf0](#) [View launch log](#)



Click the Instance ID to see the details of the instance

Instances (1/2) Info			Connect	Instance state ▾	
<input type="text"/> Filter instances					
<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check
<input type="checkbox"/>	-	i-03a86372dbaaafdf0	Running	m5.xlarge	Initializing

You will need the IPv4 or IPv4 DNS to log into the instance

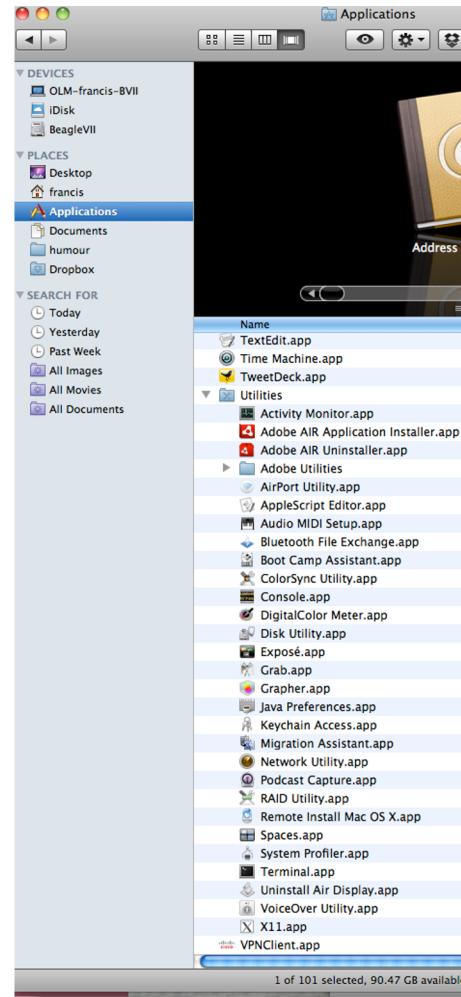
Instance summary for i-03a86372dbaaafde0 [Info](#)

Updated less than a minute ago

Instance ID	Public IPv4 address	Private IPv4 addresses
i-03a86372dbaaafde0	3.238.84.240 open address	172.31.67.40
Instance state	Public IPv4 DNS	Private IPv4 DNS
Running	ec2-3-238-84-240.compute-1.amazonaws.com open address	ip-172-31-67-40.ec2.internal
Instance type	Elastic IP addresses	VPC ID
m5.xlarge	-	vpc-a98d18d4

Log into AWS Instance

- Mac/Linux: terminal



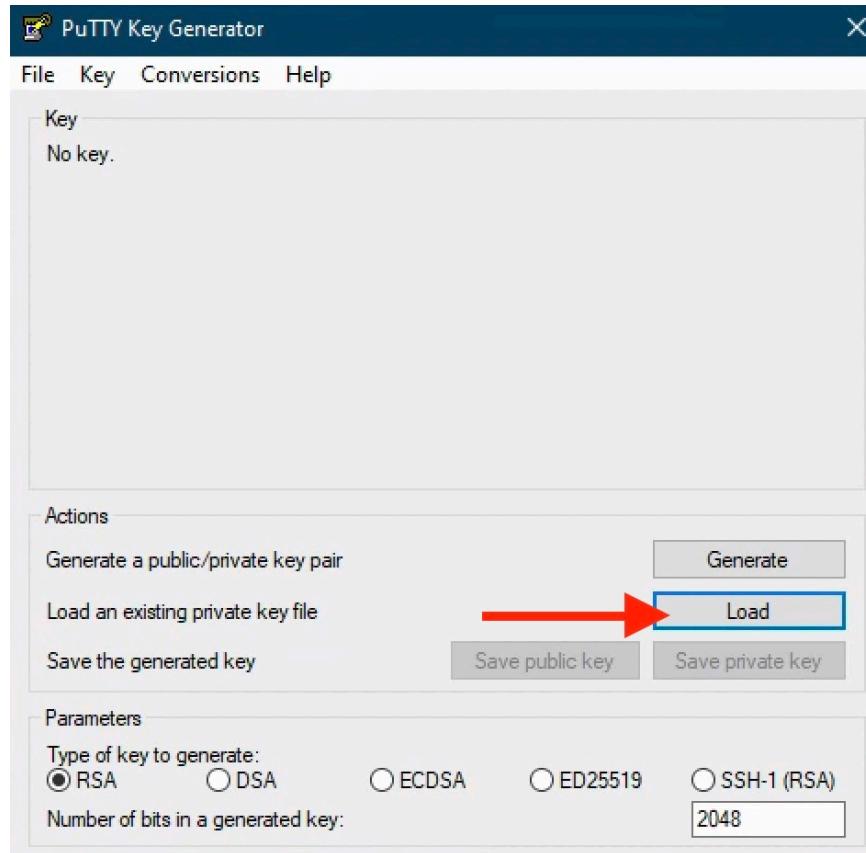
Mac/Linux

- cd Downloads
- chmod 600 CBW.pem
- ssh -i CBW.pem ubuntu@<public IPv4 or public IPv4 DNS>
- Answer “yes” when you ask if you want to continue connecting

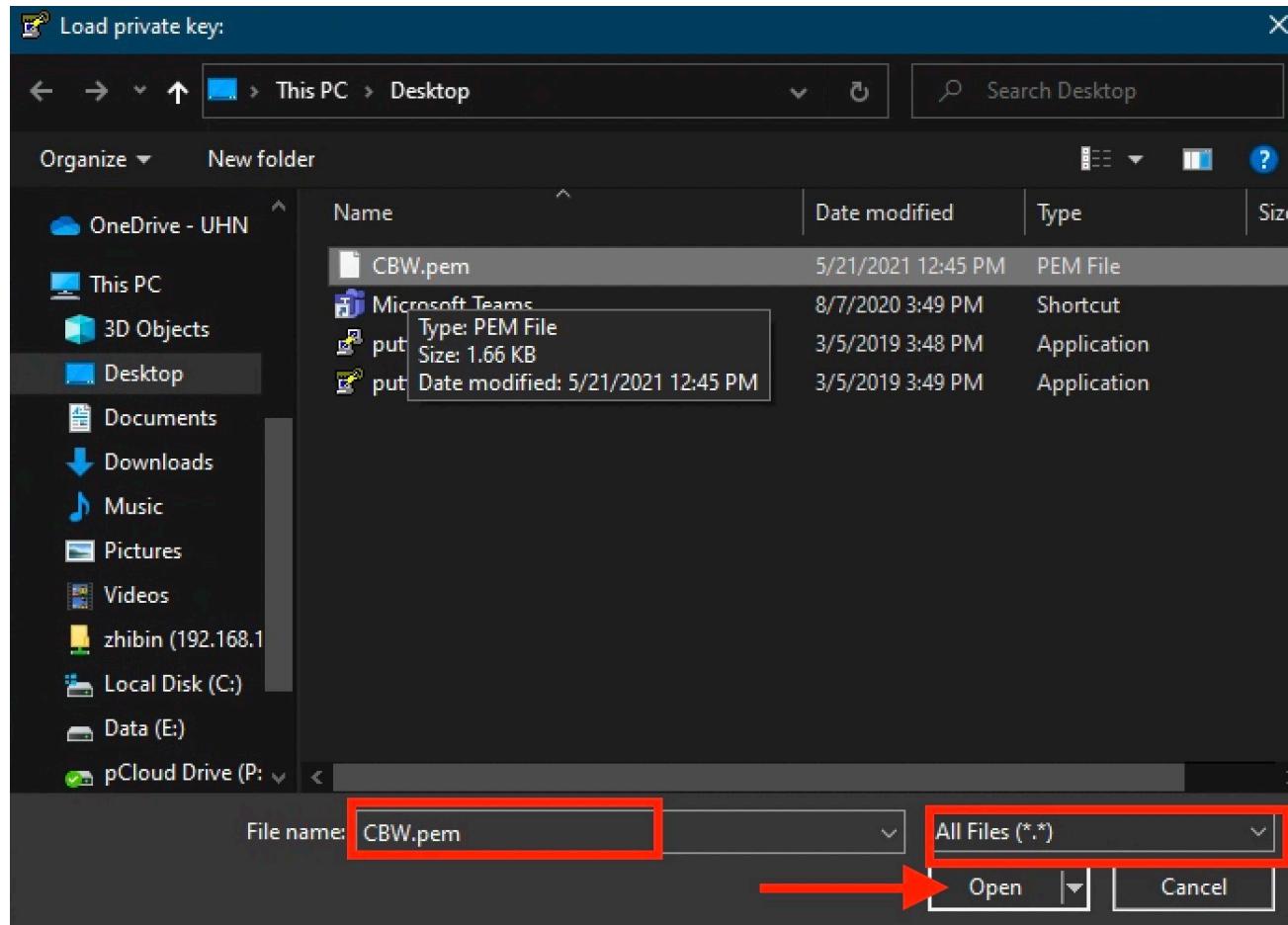
Windows

- Download putty.ext and puttygen.exe
- URL:
<https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html>

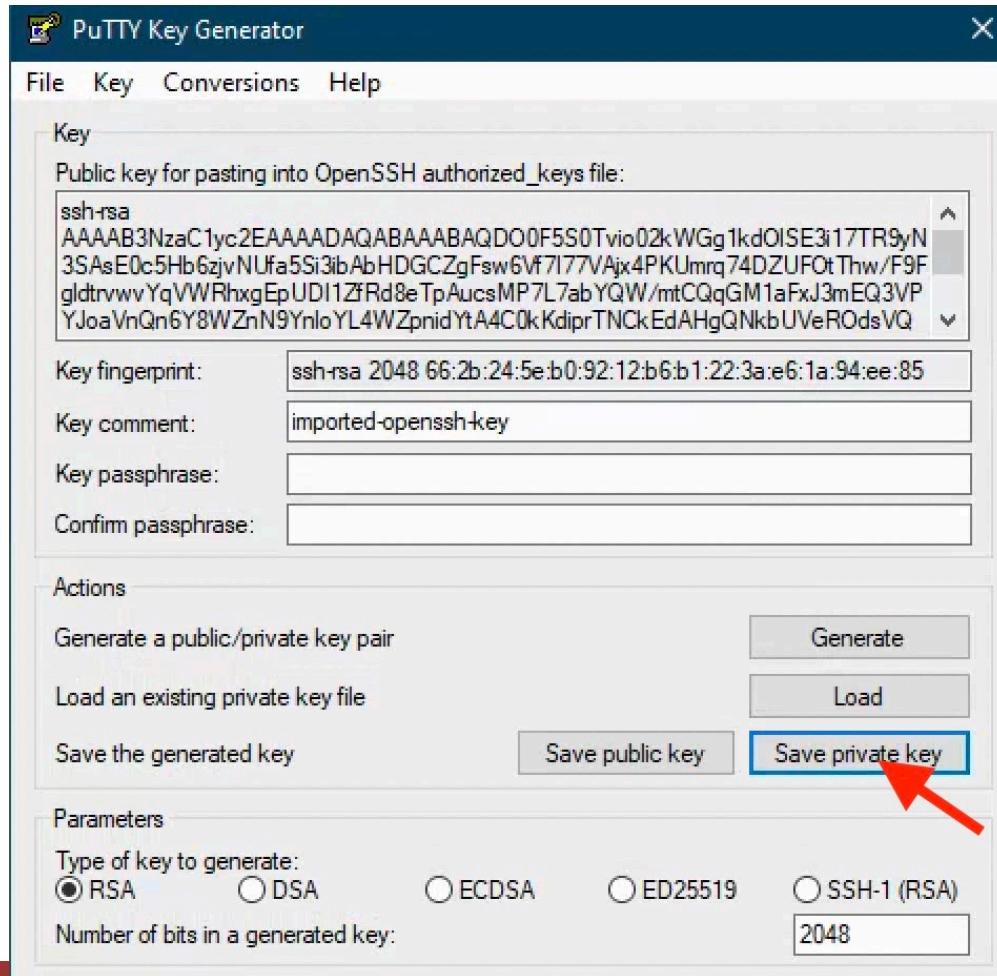
Convert pem to ppk



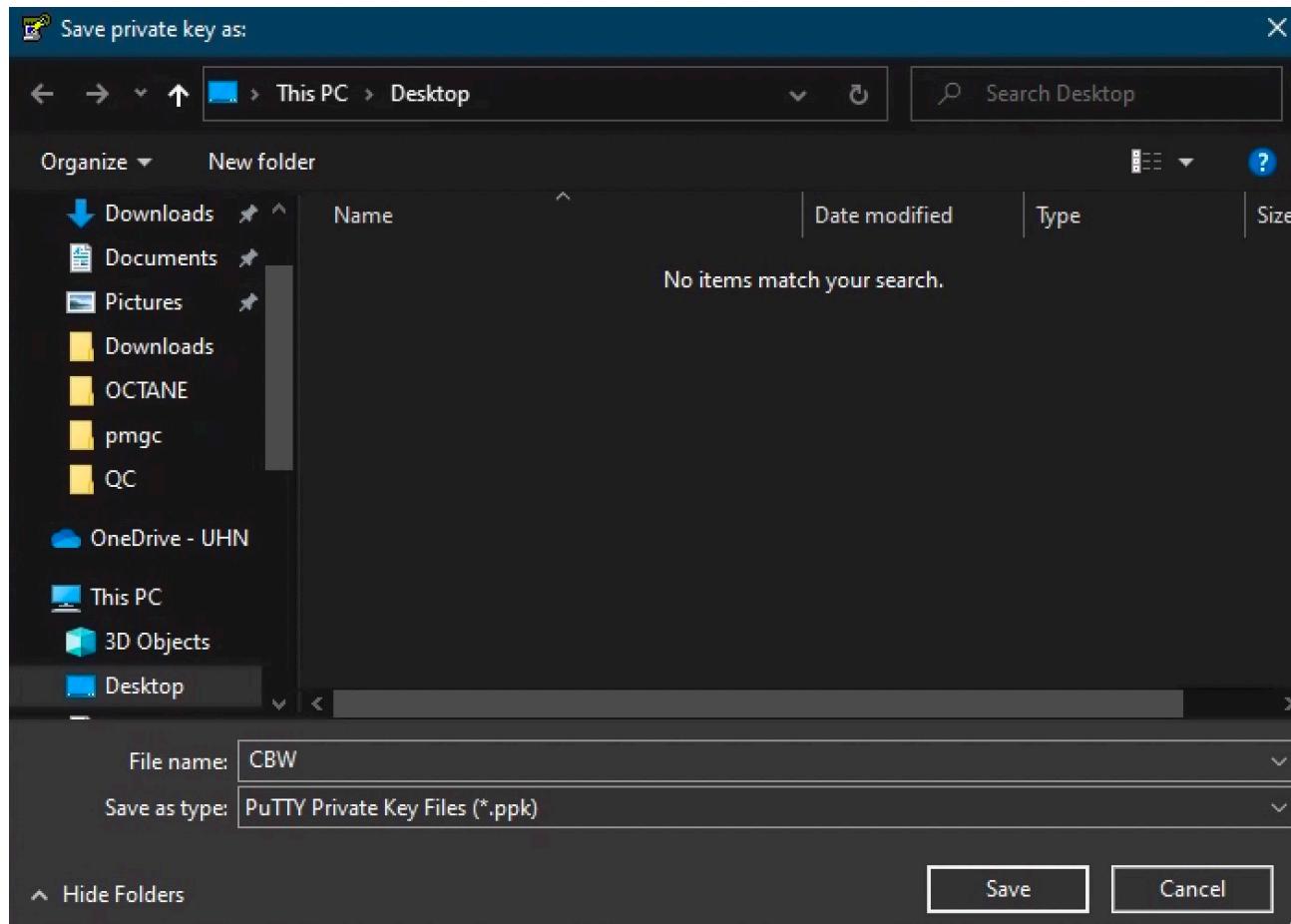
Convert pem to ppk



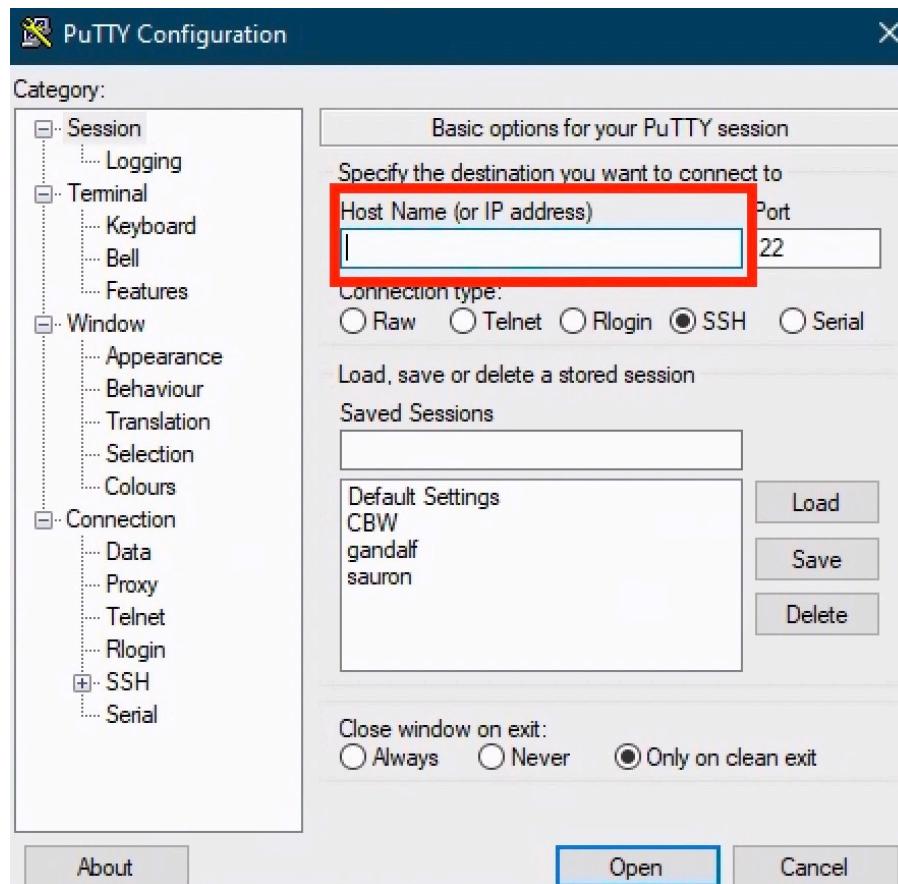
Convert pem to ppk



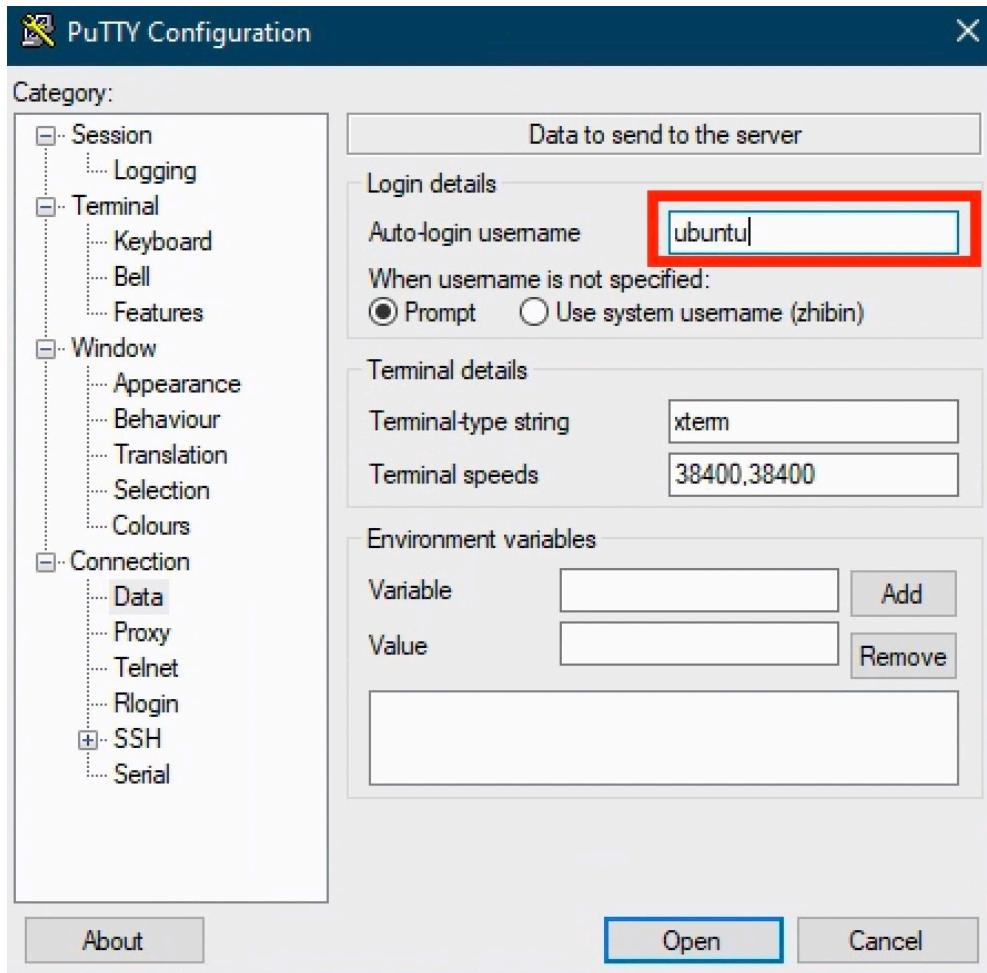
Convert pem to ppk



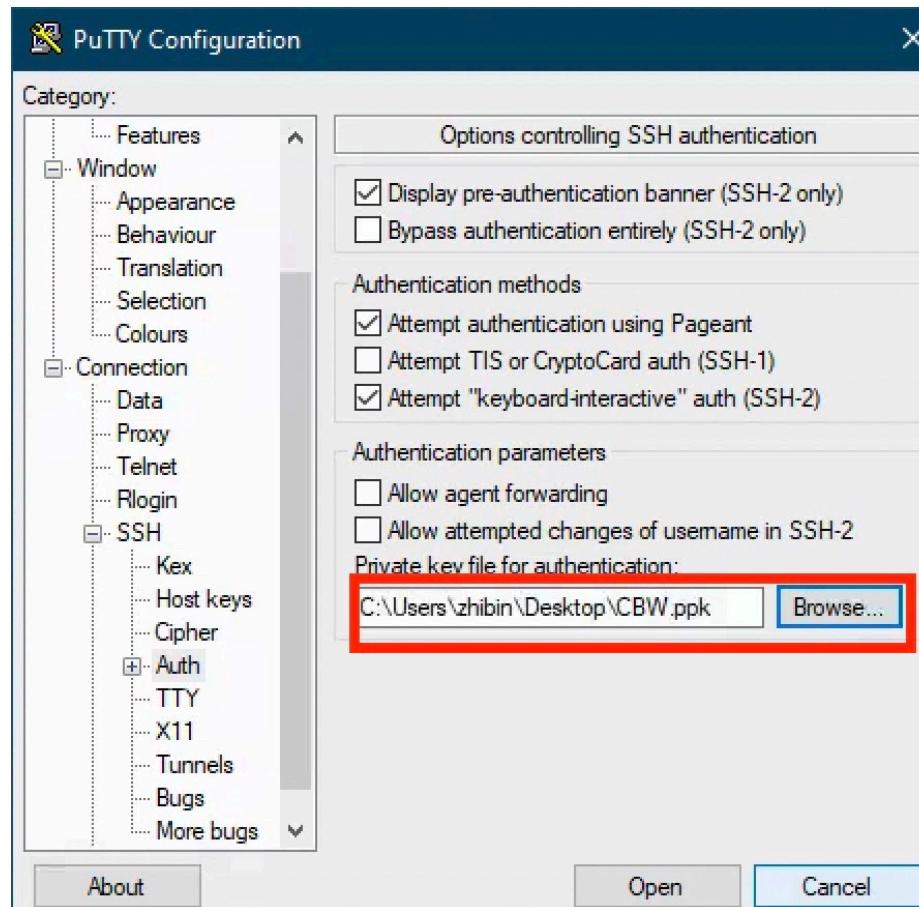
Use IPv4 or Ipv4 DNS



Use “ubuntu” as the username



Use the converted ppk file as the private key



Nothing is free!

- You pay storage, instance, data transfer, ... with your credit
- **Stop** your instance when you finish and will need it later.
- **Terminate** your instance if you will not use it anymore.

We are on a Break

Workshop Sponsors:



Canadian Centre
for
Computational
Genomics



HPC4Health

