To Boldly Install What No Student Has Installed Before: A Guide to Installing Chaste

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13th June 2025

This guide explains how to install the Chaste simulation framework on a WSL2 Ubuntu environment. The process draws on information from several online resources.

1 Prerequisites

1.1 GitHub account

If you don't already have a GitHub account, create one at `https://github.com/`. This will be necessary to access the Notochord project later.

1.2 Install WSL2 and Ubuntu

Following the instructions in [1]:

- Open Windows Command Prompt in Administrator mode.

- Enter the command:

```
wsl --install
```

- Restart the machine.

1.3 Set Up WSL Environment

Following the instructions in [2]:

- Open Ubuntu and create user account and password.

- Update package using:

  ```
  sudo apt update && sudo apt upgrade
  ```

- Configure git using the commands:

  ```
  git config --global user.name "Your Name"
  git config --global user.email "your_email@domain.com"
  ```

  replacing `Your Name` and `your_email@domain.com` with your name and email address.

2 Installing Chaste

Following the instructions in [3, 4, 5]:

2.1 Provide Linux Distribution With Enough RAM

- Open File Explorer and navigate to

  ```
  C:\Users\<YourUserName>
  ```

- Create an empty file with the name ".`wslconfig`"

- Open the file (e.g. with Notepad) and add the following:

  ```
  [wsl2]
  memory=8GB
  processors=4
  ```

- Open PowerShell and use the command:

```
wsl --shutdown
```

This will ensure that enough resources have been allocated to the Ubuntu environment. Without this, there will be problems when compiling Chaste.

2.2 Obtain and Run `chaste_install.sh`

- Open Ubuntu and run the following commands:

```
git clone https://github.com/cmarples/ChasteSetup
cd ChasteSetup
./chaste_setup.sh
```

This will obtain and run a Bash script designed to install and build Chaste, automating much of the process. Note that this step can take a long time (about 45 minutes, depending on the machine).

3 Installing the `NotochordElongation` Project

3.1 Configure Git to Clone a Private Repository

The Notochord vertex model code is currently in a private GitHub repository. To clone this from GitHub, some extra steps are required:

- Accept invitation on GitHub (`https://github.com/`).

- In Ubuntu, run the command:

```
ssh-keygen -t ed25519 -C "your_email@domain.com"
```

replacing `your_email@domain.com` with your email address. At the prompts for file and passphrase, can leave blank and just press Enter. Then run:

```
eval "$(ssh-agent -s)"
ssh-add ~/.ssh/id_ed25519
cat ~/.ssh/id_ed25519.pub
```

- Go to `https://github.com/settings/keys`, click New SSH Key and create the key, pasting in the key output from the last command.

- In Ubuntu, run the command

  ```
  ssh -T git@github.com
  ```

  and enter `yes` when prompted.

- Can now clone the NotochordElongation project using the commands:

  ```
  cd ~/Chaste/Chaste/projects
  git clone git@github.com:cmarples/NotochordElongation
  ```

If everything has gone to plan, then a folder called `Test_Notochord_Installation` should have been created in the `Chaste/output` directory. If it has, then you have successfully installed Chaste and the `NotochordElongation` project!

References

[1] Microsoft Docs. *How to install Linux on Windows with WSL*. `https://learn.microsoft.com/en-us/windows/wsl/install`. Accessed: June 12, 2025.

[2] Microsoft Docs. *Set up a WSL development environment.* `https://learn.microsoft.com/en-us/windows/wsl/setup/environment`. Accessed: June 12, 2025.

[3] Chaste Docs. *Chaste: Cancer, Heart and Soft Tissue Environment.* `https://chaste.github.io/`. Accessed: June 12, 2025.

[4] Chaste Docs. *Ubuntu package.* `https://chaste.github.io/docs/installguides/ubuntu-package/`. Accessed: June 12, 2025.

[5] Chaste Docs. *CMake first-time user guide.* `https://chaste.github.io/docs/user-guides/cmake-first-run/`. Accessed: June 12, 2025.