# Summary

This folder (which we presume you have successfully unzipped) contains modern versions of the animations for

Thermoacoustics: A Unifying Perspective for some Engines and Refrigerators

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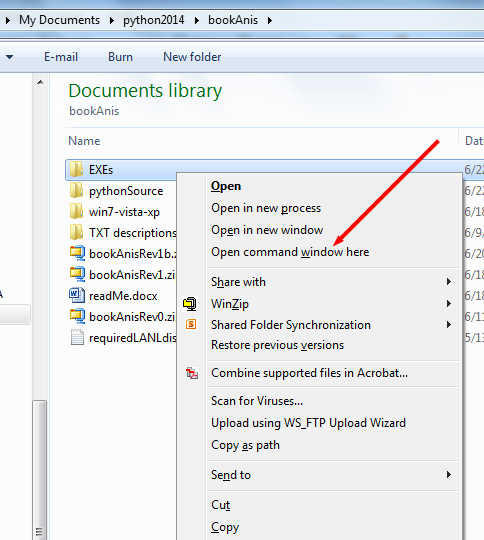
These modern animations should run on Windows and Mac operating systems circa 2015. Please read requiredLANLdisclaimer.txt in this folder for legal conditions and restrictions on use.

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# Windows 7, Windows Vista

Open the folder bookAnis\win7-vista-xp. (Sort the contents of the folder conveniently by using the standard folder options to display Details, then clicking on the Name heading to sort things alphabetically, and then clicking on the Type heading to shove the six annoying \*.tga files down to the bottom of the list.) Double click on a shortcut to launch an animation. If this works and you are satisfied, skip the rest of readMe.docx.

Alternatively: Open the folder “bookAnis” in Windows Explorer. Hold down Shift while right-clicking on the “EXEs” folder, and select “Open command window here.” The cmd.exe window that opens should give you a prompt such as “c:\Users\Documents\YourFolderName\BookAnis\EXEs”. Now you can follow the instructions in the thermoacoustics book: To launch an animation, type an animation name, or animation /option, followed by the Enter key. (e.g., “standing /c”) You can end an animation by typing “q” or the Escape key, or by clicking the X at the top-right corner of the animation window. This will return you to the cmd.exe window, where you can start another animation. To terminate the cmd.exe window, type “exit” or click the X in its top-right corner.

Yet another alternative: Open the folder bookAnis/EXEs. DoubleClick on ThermoAc.exe. A window should open with a colored button for each animation. Click on a button to launch an animation. Type “q” to quit an animation and return to the window with the colored buttons.

Another possibility: See “Further information for experienced programmers” below.

# Macs

Double-click on the thermoac.app icon. This should open a window with a colored button for each animation. Single-click on a button to launch an animation. Type “q” to quit an animation and return to the window with the colored buttons. (Don’t use the escape key to quit an animation, because this will terminate the entire application.) If this works and you are satisfied, skip the rest of readMe.docx.

Don’t worry if each “quit” leaves a dead animation icon in the dock. If the app slows down when a dozen dead icons have piled up, just exit from the app and restart it.

Please do not click the same button twice in a row without moving the mouse. This avoids an intermittently buggy interaction of mouse clicks with the app on some Macs, which we have not been able to figure out.

We are not registered Mac application developers, so Mac security may warn you about “unidentified developers” the first time you try it. If this occurs, locate the thermoac app in Finder, press the Control key, then click the thermoac.app icon. Choose Open from the shortcut menu, and click Open. This will save thermoac as an exception to your security settings, so it will open normally in the future.

If your display is small, it may be helpful to put the Mac’s dock on the right side of the display.

The animations are 1000 pixels wide and 768 pixels tall. On a small-screen laptop, you might have to change the screen resolution to something like 1280 x 800 to see the bottom edge of all animations.

Alternative: Obtain a Windows emulator such as VMwareFusion, then install Windows, then use the Windows version of the animations. More awkward, but cheaper: install virtualBox on the Mac, then Linux, then Wine.

Another possibility: See “Further information for experienced programmers” below.

# Windows XP

Open the folder bookAnis\win7-vista-xp. Double click on a shortcut to launch an animation. If this works and you are satisfied, skip the rest of readMe.docx.

Alternatively, click the “Start” button in the lower-left corner of your computer, and then click “Run”. In the Windows Run box, type cmd, and then the Enter key. This should launch a Windows cmd.exe window, with a prompt such as “c:\Users\YourName” showing what drive and folder the cmd window is operating in. Type cmd’s internal commands such as “dir” or “dir /p” or “dir \*.exe” if you want to display the contents of the folder you are in, and commands such as “cd my documents”, “cd bookanis\EXEs” to change directory (i.e., change folder) until you are in the bookAnis\EXEs folder. ( “cd .. ” moves one level up in the folder hierarchy. To change to a different drive, such as d: instead of c: , just type “d:”) Now you can follow the instructions in the thermoacoustics book: Type an animation name, or animation /option, followed by the Enter key, to launch an animation. (e.g., “standing /c”) You can end an animation by typing “q” or the Escape key, or by clicking the X at the top-right corner of the animation window. This will return you to the cmd.exe window, where you can start another animation. To end the cmd.exe window, type “exit” or click the X in its top-right corner.

# Troubleshooting

If tashe and ptr seem to open with a blank dark screen, check your screen resolution. It must be at least 1280 x 800. If the vertical resolution is less than 800 pixels, the initial menu of tashe and ptr will fall off the bottom of your screen. (In a MacBook, click the Apple symbol, SystemPreferences, Displays, and adjust the resolution.)

In Windows, if the shortcuts in the win7-vista-xp folder don’t work, try double-clicking on an animation.exe file in the EXEs folder. This should open and run the animation, but without the “ /option ” option.

In Windows XP or Vista, if double-clicking on an animation.exe file in the EXEs folder is unsuccessful, it might be because your computer does not have a crucial file called msvcp90.DLL. (This was the problem with the oldest XP computers at Los Alamos, which failed to run the animations.) We have not included a copy of this DLL with our animations because of Microsoft Visual C++ licensing issues. To complicate things, several versions of this DLL exist, each with the same filename. You may need the same version that the Python interpreter was compiled with, which is version 9.0.21022.8. To verify the version of a DLL file, right click on the file, select Properties, and go to the Details tab. Googling for this file name and python will lead you to some advice on obtaining a copy if your computer does not already have it. Example: [www.py2exe.org/index.cgi/Tutorial](http://www.py2exe.org/index.cgi/Tutorial) , step 5.2, describes how to obtain Microsoft's vcredist\_x86.exe, published 29-11-2007, which has the correct version. To make the animations work on our oldest XP computers, we downloaded and ran the vcredist\_x86.exe file from <http://www.microsoft.com/en-us/download/details.aspx?id=29> , which installed a few files including the correct version of msvcp90.DLL .

In Windows 7, if double-clicking on an animation.exe file in the EXEs folder is unsuccessful, it might be because your computer does not have the correct version of msvcp90.DLL. Please search your computer for this file; you will probably find many copies. Please check the version of each copy, by right clicking on the file, selecting Properties, and going to the Details tab. See if one of your copies is version 9.0.21022.8. Also please make a note of any diagnostic messages that appeared in the cmd.exe window when you tried to launch the animation from cmd.exe. Also please look for any new file with the format \*.exe.log in the EXEs folder, which would have additional diagnostic information. Report your situation to Greg or Bill at Los Alamos, and we’ll try to help you decide what to do next.

If the shortcuts don’t work, and if double-clicking on an animation.exe file works ok but you have not successfully run your computer’s built-in cmd.exe, it might be easiest to seek local advice about cmd.exe so you can open the animations with their built-in options, too. A more laborious approach to access “/option ” in an animation without using cmd.exe is to copy each animation file and rename the copy “animation-option.exe ” . (e.g., “ptr-r.exe”) This works because the animations know that they should decide how to behave based on the name by which they are launched.

# Further information for experienced programmers

These animations are written in visual python. The \*.exe versions of the animations, along with everything else in the EXEs folder, have been packaged for thermoacousticians with a python interpreter that runs them on computers without the need to install python itself. For the Windows and the Mac versions, we used these:

Windows:

python-2.7.6,

vPython-Win-Py2.7-5.74, and

py2exe-0.6.9.win32-py2.7

Old Macs:

Python 2.7.8 for Mac osx 10.5

Vpython-mac-PY2.7-5.74

py2app-0.9

New Macs:

Python 2.7.9 for Mac osx 10.6 and higher

Vpython-mac-Py2.7-6.11

py2app-0.9

to create these packages. When creating executables and apps, we stripped the textured “materials” stuff out of vpython so our packages don’t need the vpython’s huge \*.tga files that are difficult to insert in the package framework.

To link to an animation from within Powerpoint in Windows, use the Action button (not the hyperlink button) and select RunProgram for the ActionOnClick. Browse the animation name in the EXEs subfolder. To launch that animation with an option, append the option (for example, “path/thermal.exe /e”).

People who are comfortable with python can use the animations’ source files, \*.py, which are provided in the "pythonSource" folder. At present, this is the only way to run the animations on a Linux platform. As of early 2014, we have found that downloading and installing Python 2.7.6 from www.python.org, and then Vpython 6 from Vpython.org, works fine (on all but one old Win7 computer, which is happier with Vpython 5 instead). Once those are installed, you should be able to double-click on one of the animation.py files to launch an animation. Or type “python animation.py /option” from within a shell (e.g., cmd.exe) window.

We are providing many ways to launch these animations in the hope that one or more ways will still work in operating systems of the future.