World of Cyberfungi? What's that?

Well, if you want the technical description it's a set of interactive computer models that simulate the way fungi grow in three-dimensional space. We call it the Neighbour-Sensing mathematical model of hyphal growth, and the mathematics and computer programs were worked out by Audrius Meškauskas.

The less technical description is that it's a fun way to watch **virtual fungi** 'growing' on your device's screen (and then 'clean it off' at the click of a button). The apps that make up the modelling program allow you to change the characteristics of the growing fungus.

Things like the amount of branching, angle of branching and whether hyphal threads stay together or grow apart (among several other features) can all be changed to establish their effect on the way the **simulated hyphae** grow. **The ultimate, controllable, and most realistic cyberfungus on your own computer**.

We have used the Neighbour-Sensing mathematical model of hyphal growth to study fungal networks. Our three-dimensional simulation of growing fungi is an experimental tool. It is not a game or a painting program.

Rather, it provides the user with a way of experimenting with features that may regulate hyphal growth patterns to arrive at suggestions that could be tested with live fungi.

If you stick with these pages, we'll give you a complete outline of the science and mathematics that underpin the Neighbour-Sensing model of hyphal growth, but if you want to go straight to our research papers you can start in the information box at the bottom of this page.

Check out our pages about our remarkable **Neighbour-Sensing model** by using the hyperlinks below ***EITHER*** to view the online pages of the website ***OR*** to download a PDF version of those pages (CLICK HERE for a PDF version of ***this*** page):

- Turning real fungi into cyberfungi ***OR*** fetch a PDF version
- Fungal dynamics: how real fungi grow ***OR*** fetch a PDF version
- Overview of the Neighbour-Sensing model without the maths ***OR*** fetch a PDF version
- Mathematical description of the Neighbour-Sensing Model ***OR*** fetch a PDF version
- Experimental use of the model ***OR*** fetch a PDF version
- Liam McNulty's Guide to experiments with the Neighbour-Sensing model of mycelial growth ***OR*** fetch a PDF version

- Some more examples we prepared earlier ***OR*** fetch a PDF version
- Modelling gravitropism in mushrooms (and other organisms) ***OR*** fetch a PDF version
- Neighbour-Sensing documentation ***OR*** fetch a PDF version

If you want to go straight to our research papers, we recommend that you read these three in this order:

The text above gives a brief outline of the kernel of the **Neighbour-Sensing mathematical model**. All the details about the original model and the enhancements that have now been completed have been published in our research papers, which include an extensive collection of examples and experimental results.

You can download reprints of these publications as (free) PDF files from http://www.davidmoore.org.uk/CyberWEB/.

(1) Moore, D., McNulty L. J. & Meškauskas, A. (2004). Branching in fungal hyphae and fungal tissues: growing mycelia in a desktop computer. An invited chapter for the book *Branching Morphogenesis*, ed. J. Davies published by Landes Bioscience Publishing/ Eurekah.com [published online at http://www.eurekah.com/isbn.php?isbn=1-58706-257-7&chapid=1849&bookid=125&catid=20].

(2) Meškauskas, A., McNulty, L. J. & Moore, D. (2004). Concerted regulation of all hyphal tips generates fungal fruit body structures: experiments with computer visualisations produced by a new mathematical model of hyphal growth. *Mycological Research*, **108**: 341-353.

(3) Meškauskas, A., Fricker, M. D. & Moore, D. (2004). Simulating colonial growth of fungi with the Neighbour-Sensing model of hyphal growth. *Mycological Research*, **108**: 1241-1256.

Nothing you see here is fake. It's all true. Merely controlled