

Breaking the closed source barrier

The what, how, and why of open source programming in science

David Katzin, 27 October 2022

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Outline for this session

- What is open source programming (or coding, scripting, etc.)?
- Why open source?
- How?



<https://entrepreneurhandbook.co.uk/open-source-software/>

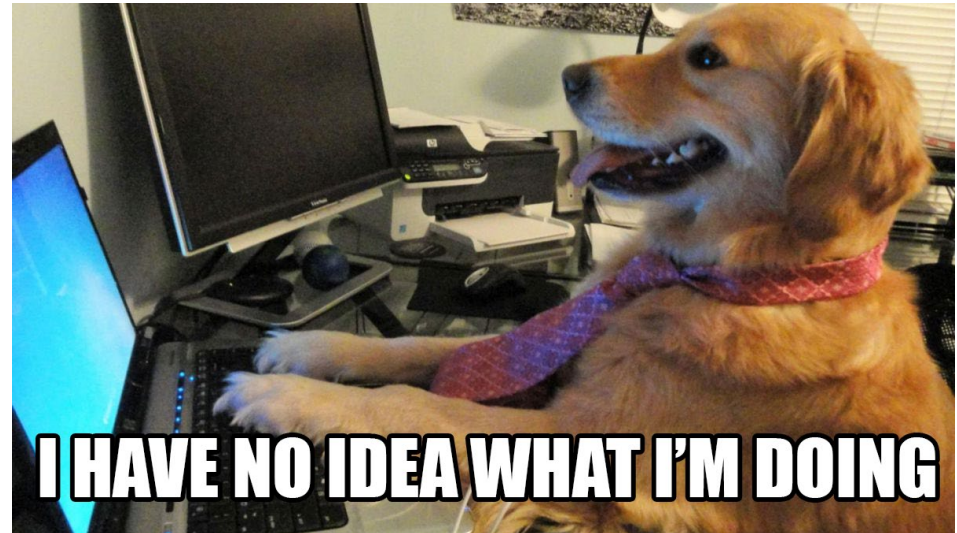
About me

- Greenhouse modeller
 - PhD Wageningen University 2016-2021
 - Now Wageningen Research
- Background in mathematics and graphic design
- Some background in computer science (mostly theoretical, mostly from ages ago)



About me

- Before entering research:
 - Little experience in programming
 - No experience in large-scale software projects



What is open source programming?

What is open source programming?

- “You mean open access?”
- “My code is open source, I will give it to anyone who will contact me”

Appendix A

A.1 MATLAB Code for computer program of conventional greenhouse

© Copyright

Main model

```
clear all
close all
clc
%-----Input-----%
%-----Input for Location-----%
LATD=52.09;
LON=-106.82;
LST=-90
%-----Input got greenhouse-----%
L=43.29;           % Length of span
W=6.4;            % Width of span
NS=4;             % Number of span
H=5.3;            % Height up to the ridge
HS=3.65;          % Gutter height
%-----Roof-----%
SRA=26;           % Angle of south roof
SRA1=0;
SRA2=0;
ASD=155.86*NS.    % Area of south roof
```

Open source is...

- One of the practices included under open science

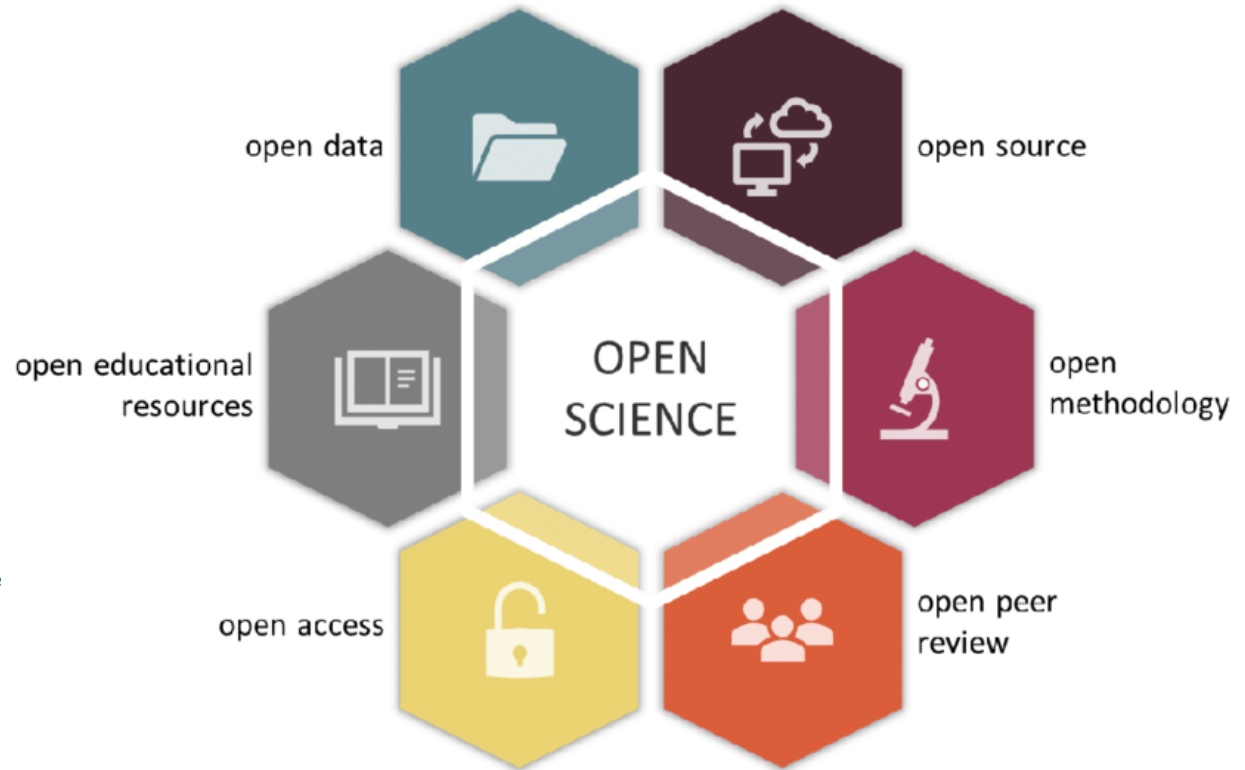


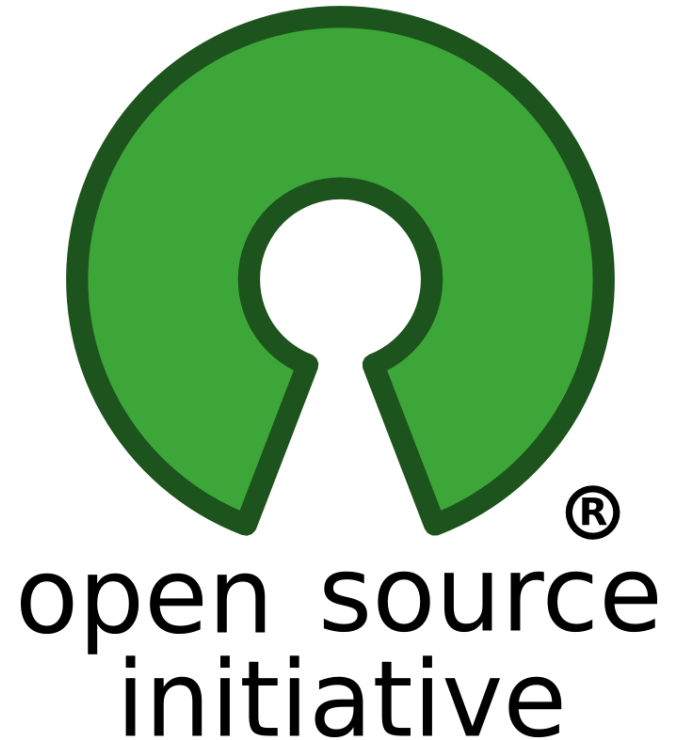
Image from: Gallagher et al., "The Open Traits Network: Using Open Science principles to accelerate trait-based science across the Tree of Life" (Preprint, 2019), <http://dx.doi.org/10.32942/osf.io/kac45>.
Appeared later as "Open Science principles for accelerating trait-based science across the Tree of Life", (Nature Ecology & Evolution, 2020), <https://doi.org/10.1038/s41559-020-1109-6>

Open source is...

- OSI definition: software that is released under a license in which the copyright holder grants users the rights to:
 - Use
 - Study
 - Change
 - Distribute

the software and its source code to anyone and for any purpose.

- <https://opensource.org/docs/osd>
- <https://opensource.org/licenses/>



Other terminologies

- “Source available software” labelled as “open source”
- E.g., Microsoft Shared Source Initiative



Image: <https://www.gizmochina.com/2021/02/11/microsoft-was-in-talks-pinterest-acquisition/>

Other terminologies

■ Free software:

“The free software movement campaigns for your freedom in your computing, as a matter of justice. The open source non-movement does not campaign for anything”

■ <https://www.gnu.org/philosophy/words-to-avoid.html>

■ <https://www.gnu.org/philosophy/open-source-misses-the-point.html>

■ <https://thebaffler.com/salvos/the-meme-hustler>

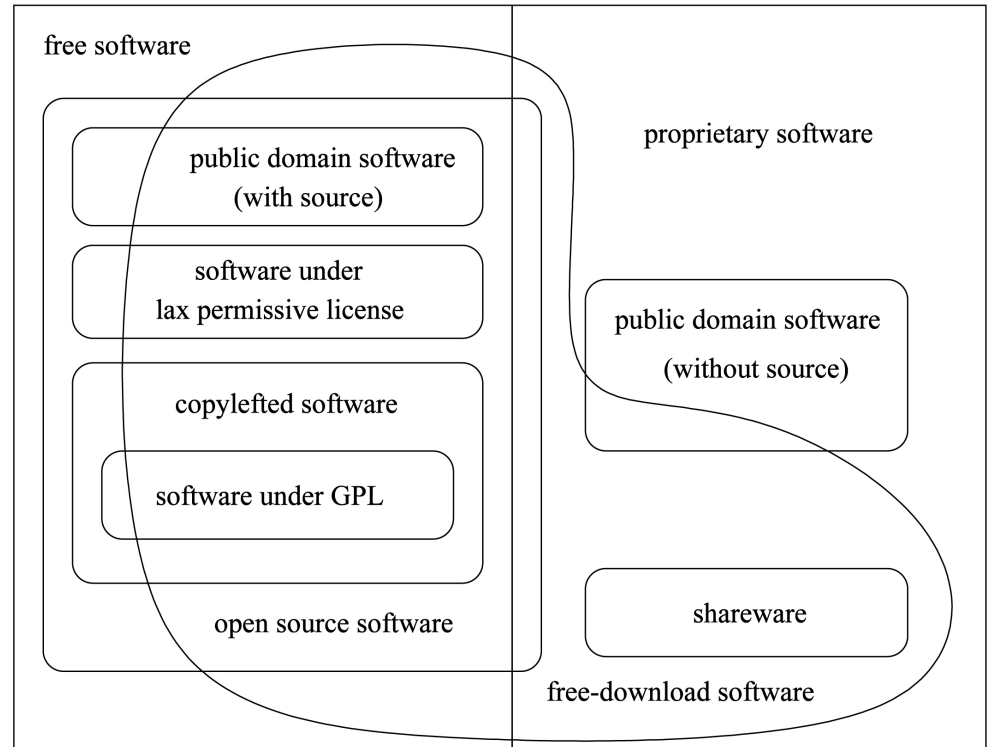
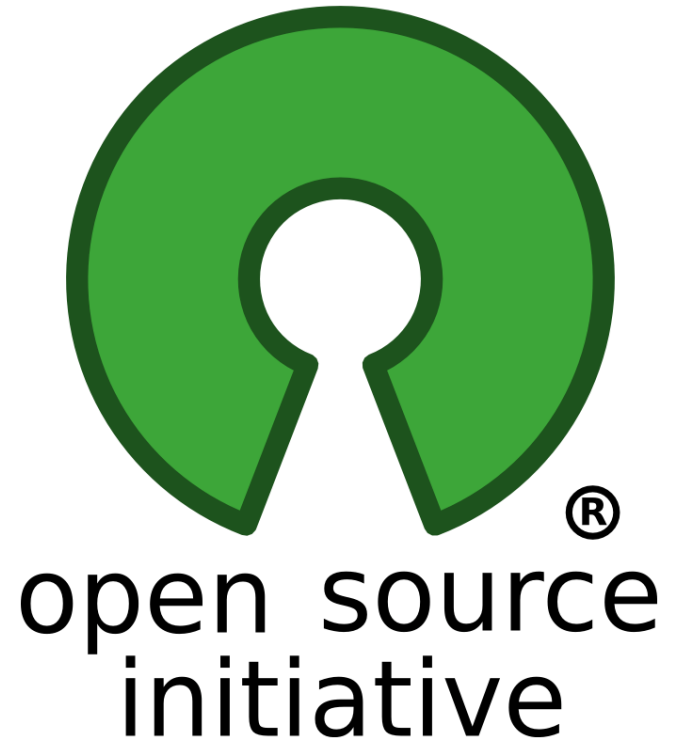


Image: Chao-Kuei, <https://www.gnu.org/philosophy/categories.html.en>

“The four freedoms”

- In this session we will focus on code that is available (in some way) to:
 - Study
 - Distribute
 - Use
 - Change
- I hope to encourage you to have your code do one of these things
- And/or make it FAIR (findable, accessible, interoperable, or reusable)



What I did

- Wrote some code as part of my research
- Published it on github.com under a free license



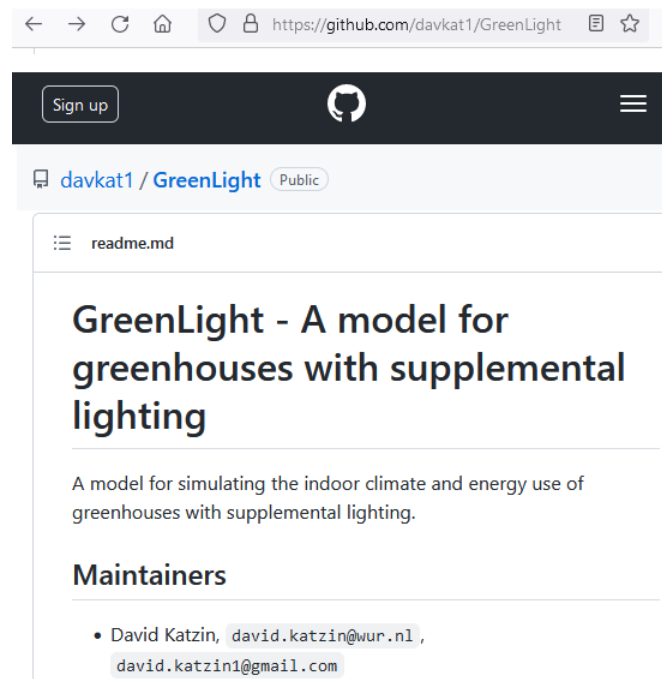
Biosystems Engineering
Volume 194, June 2020, Pages 61–81



Research Paper

GreenLight – An open source model for greenhouses with supplemental lighting: Evaluation of heat requirements under LED and HPS lamps

David Katzin ^a, Simon van Mourik ^a, Frank Kempkes ^b, Eldert J. van Henten ^a



Cite as

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Why open source?

Why open source?

- Transparency: others can read and check
- Reusability: others can use the work
- Extendibility: others can expand on the work



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My own experience

- Students use the code (Netherlands, Germany, Canada)
- Professionals (Latvia, Saudi Arabia)
- Researchers (Netherlands)
- Impact
- Opportunities
- Collaboration



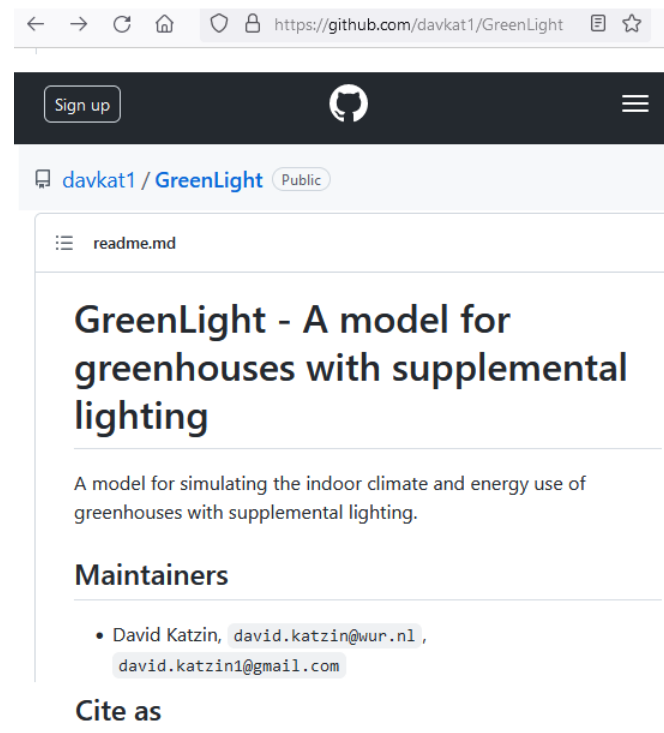
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Why not open source?

Why not open source?

- My code is not clean/clear enough for others to read
- I don't know if I'm allowed to share my code
- I'm afraid others will find mistakes



<https://entrepreneurhandbook.co.uk/open-source-software/>

Solutions

- Writing code takes training and practice
- Get help from others
- Use style guides
 - Python: pep8.org/
 - MATLAB:

<https://nl.mathworks.com/matlabcentral/fileexchange/46056-matlab-style-guidelines-2-0>



<https://www.rasmussen.edu/degrees/technology/blog/why-learn-to-code/>

Solutions

- Code review from peers



Bernhard Clemm
@BernhardClemm



I herewith offer free code review for social scientists (R, Python and SQL) - I am serious!

<https://twitter.com/BernhardClemm/status/1572607407213215751>

Solutions

- Accept that you are not perfect
- Sharing messy code is better than not sharing at all
- Sharing and getting feedback best way to improve
- Do what feels right for you, take small steps



<https://www.rasmussen.edu/degrees/technology/blog/why-learn-to-code/>

Tools available

- Share code: github.com
- Choose a license: choosealicense.com
- Get a DOI for your code: zenodo.org
- The Journal of Open Source Software: joss.theoj.org



<https://www.rasmussen.edu/degrees/technology/blog/why-learn-to-code/>

Courses

- <https://wgs.crs.wur.nl>
- <https://www.pe-rc.nl/postgraduate-courses/long-term-planning>
- software-carpentry.org



<https://www.rasmussen.edu/degrees/technology/blog/why-learn-to-code/>

Suggestions, questions, ideas?