



University
of Glasgow



CompBio Careers

William Haese-Hill

Research Software Engineer

28/11/2025

MY BACKGROUND

PhD in Mathematical
Physics

2015



Loughborough
University



Loughborough University Science and
Enterprise Park

Software Developer
in Industry

(~7 years)



Nigel Cox / Holborn Town Hall



University
of Glasgow

Research
Software Engineer

From 2021

Maths PhD

2011-2015

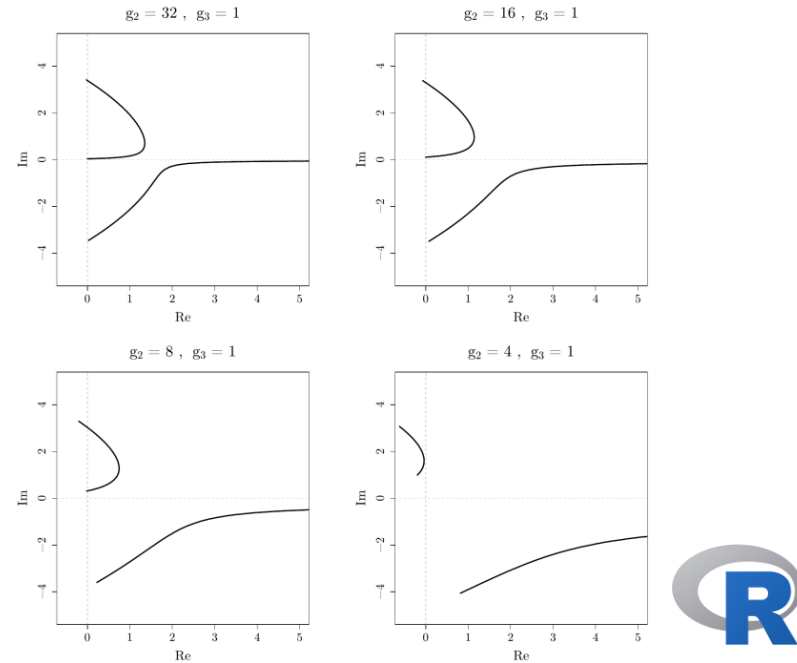
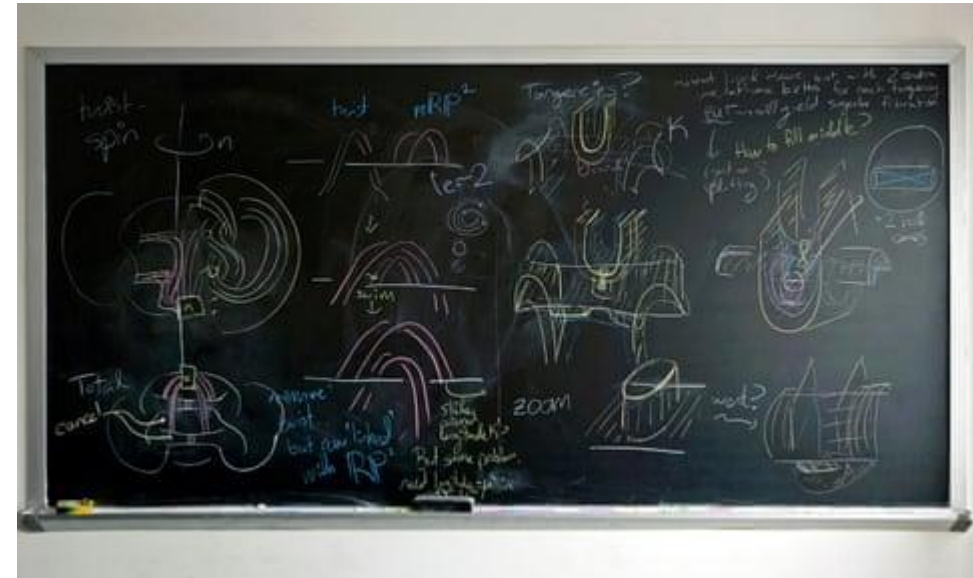


Figure 4. Spectra of the complex Lamé operator (3.1) for rectangular period lattices \mathcal{L} , $m = 1$ and $\omega = \omega_2$.

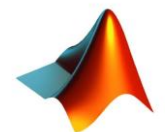
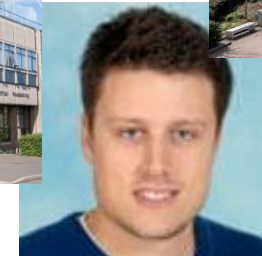
The Lamé equation

$$-\frac{d^2\psi}{dz^2} + m(m+1)\wp(z)\psi = \lambda\psi,$$



Mathematician Maggie Miller's blackboard at Princeton University. Photograph: Jessica Wynne

[Why mathematicians just can't quit their blackboards | Photography | The Guardian](#)



MATLAB

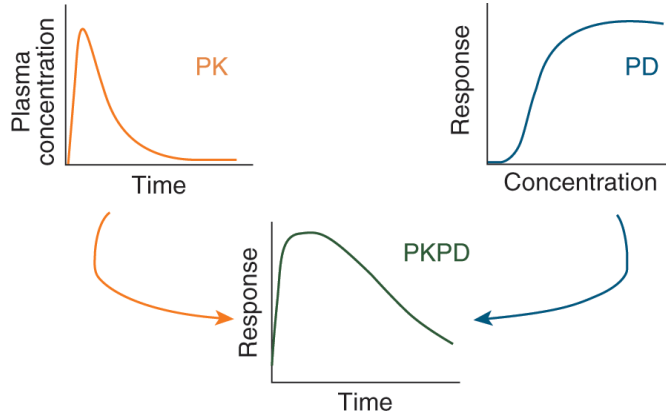
(teaching)

PK/PD modeller

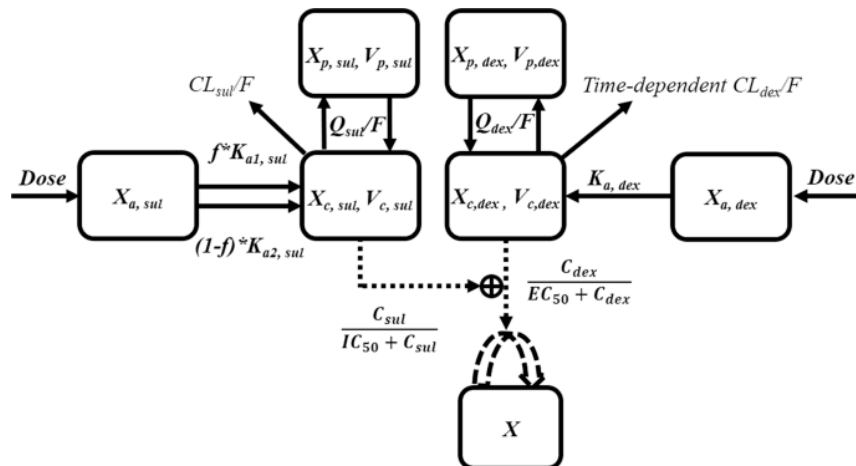
2014-2017



BAST
Pharmaceutical
CRO



<https://aneskey.com/2-pharmacokinetic-and-pharmacodynamic-modelling-in-anaesthesia/>



<https://doi.org/10.1038/s41401-019-0251-7>

NONMEM®
The program for Nonlinear
Mixed Effects Modeling

```

$PROBLEM WARFARIN ; Problem title
$INPUT ID TIME AMT RATE MDV DV ; Column names
$DATA warfarin.csv ignore=C

$SUBROUTINES ADVAN2 TRANS2 ; ADVAN2 is 1st order absorption, one central compartment

$PK
; MU referencing is not required, but can be helpful in evaluating FIM analytically,
; providing greater significant digit precision and speed
MU_1=LOG(THETA(1))
MU_2=LOG(THETA(2))
MU_3=LOG(THETA(3))
CL=EXP(MU_1+ETA(1))
V=EXP(MU_2+ETA(2))
KA=EXP(MU_3+ETA(3))
S2=V
F1=1.0

$ERROR
IPRED=A(2)/V
Y=IPRED + IPRED*EPS(1)

$THETA
0.15 ; [CL]
8.0 ; [V]
1.0 ; [KA]

$OMEGA (0.07) (0.02) (0.6)
$SIGMA 0.01 (0.001 FIXED)

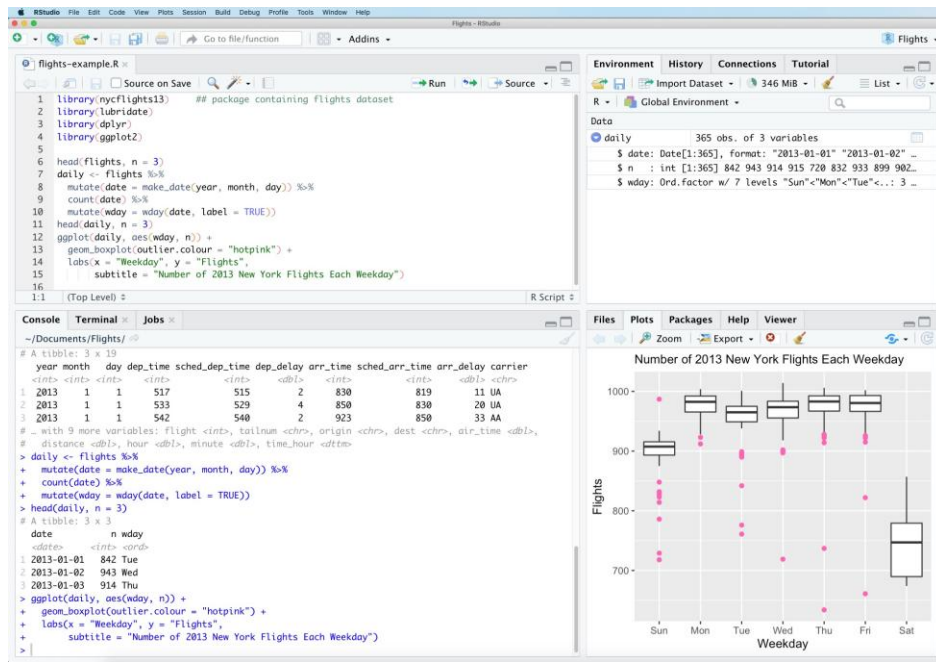
;GROUPSIZE is a multiplier to the FIM
;FIMDIAG=1 means to use block diagonal FIM
$DESIGN GROUPSIZE=32 FIMDIAG=1
    
```

<https://doi.org/10.1002/psp4.12713>

ITERATION NO.:	5	OBJECTIVE VALUE:	258.957563934051	NO. OF FUNC. EVALS.:	9
CUMULATIVE NO. OF FUNC. EVALS.:	50	NPARAMETER:	9.1589E+00 1.1377E+01 1.2408E+01 3.6237E+01 8.8238E-02	PARAMETER:	7.0529E-01 2.2898E-01 3.1574E-01 1.3875E+00 1.1887E+00
GRADIENT:	9.5850E+01 -8.2429E+00 3.1222E+00 3.8762E+01 3.2519E+01				
ITERATION NO.:	10	OBJECTIVE VALUE:	239.964297920093	NO. OF FUNC. EVALS.:	8
CUMULATIVE NO. OF FUNC. EVALS.:	92	NPARAMETER:	8.3274E+00 1.0524E+01 1.1217E+01 2.7445E+01 4.3665E-02	PARAMETER:	6.1011E-01 1.5105E-01 2.1483E-01 1.1096E+00 8.3699E-01
GRADIENT:	5.8991E+00 -1.6976E+00 -5.6022E-01 5.3623E-01 -9.7553E-01				
ITERATION NO.:	15	OBJECTIVE VALUE:	239.944172097418	NO. OF FUNC. EVALS.:	10
CUMULATIVE NO. OF FUNC. EVALS.:	142	NPARAMETER:	8.2732E+00 1.0543E+01 1.1222E+01 2.7704E+01 4.4070E-02	PARAMETER:	6.0358E-01 1.5288E-01 2.1531E-01 1.1190E+00 8.4160E-01
GRADIENT:	1.7927E-02 2.4236E-02 1.4929E-02 2.2920E-03 5.9059E-02				
Elapsed estimation time in seconds:	0.13	Elapsed covariance time in seconds:	0.05		
Press any key to continue . . .					

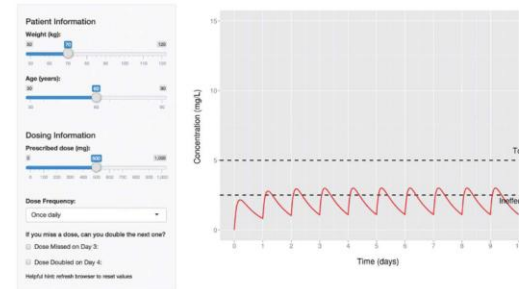
<https://www.pmxsolutions.com/2018/07/01/running-nonmem-models-and-r-scripts-from-batch-files/>

Intro to scripting/coding



cdhowe, CC BY-SA 4.0 <<https://creativecommons.org/licenses/by-sa/4.0/>>, via Wikimedia Commons

How many times a day and at what dose do you need to take this medication so that it is effective but not toxic?



How many times a day and at what dose do you need to take this medication so that it is effective but not toxic?

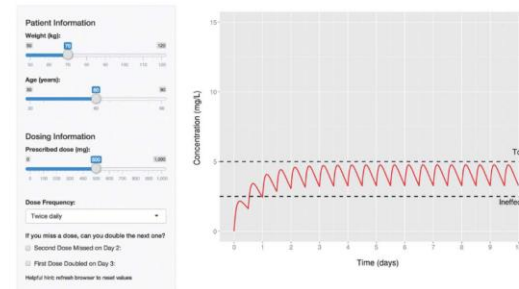
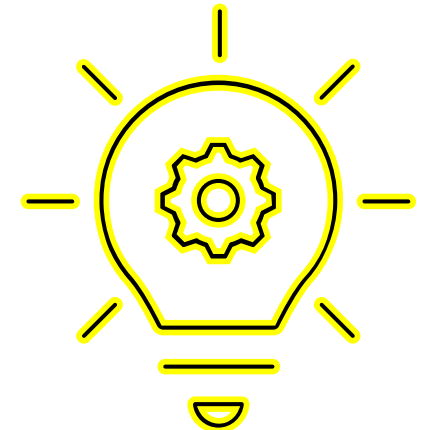
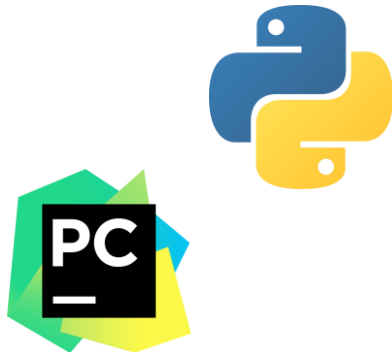


Figure 3 Preliminary patient education tool application. Shown are screenshots of the application featuring a one-compartment first-order absorption model running in a browser-window. The concentration-time profile is depicted as the solid red line, and black horizontal dashed lines represent the hypothetical therapeutic window (drug is ineffective at less than 2.5 mg/L, and toxic when greater than 5 mg/L). Top: Upon application initiation, the "Dose Frequency" selection box is pre-set to once daily, and the output plot displays the concentration-time profile for the hypothetical drug over 10 d (10 doses) accordingly. Bottom: A scenario where the twice-daily dosing regimen is selected. The plot automatically updates to show the concentration-time profile when 20 doses are administered within the same 10-d period. The "missed dose" and "double dose" checkboxes also automatically update to describe specific doses in the twice-daily regimen.



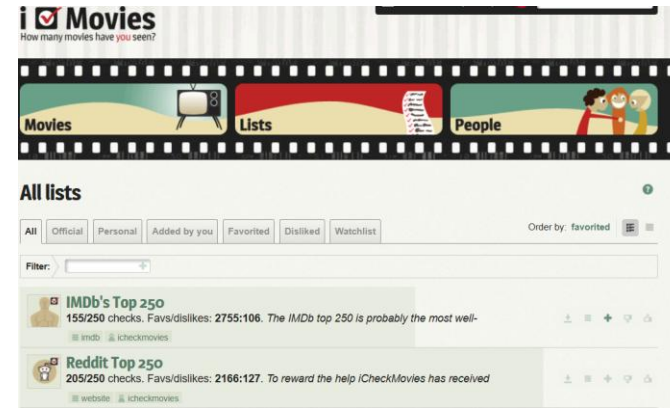
Personal programming projects



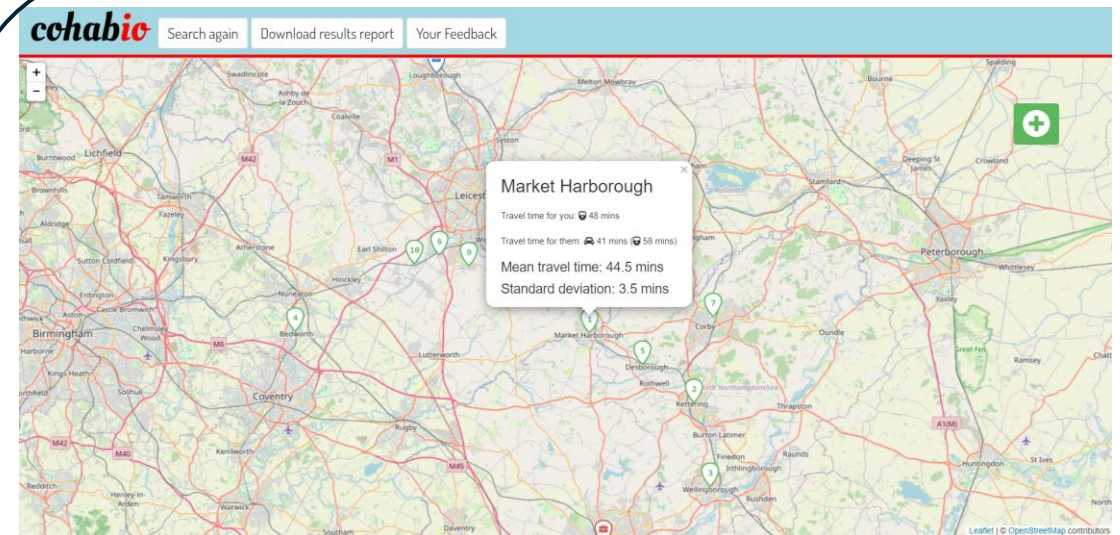
django

```
20 response = self.client.get(reverse('polls:index'))
21 self.assertEqual(response.status_code, 200)
22 self.assertContains(response, "No polls are available.")
23 self.assertQuerysetEqual(response.context['latest_question_list'], [])
24
25 @unittest.skipUnless(settings.TESTING, 'not in a unittest')
26 def test_index_view_with_a_future_question(self):
27     """
28     Test the index view with a future question.
29     """
30     question = Question.objects.create(
31         question_text="Future question.", pub_date=timezone.now() + timedelta(days=30)
32     )
33     response = self.client.get(reverse('polls:index'))
34     self.assertEqual(response.status_code, 200)
35     self.assertQuerysetEqual(response.context['latest_question_list'], [])
36
37 def test_index_view_with_a_future_question_and_past_question(self):
38     """
39     Test the index view with a future question and a past question.
40     """
41     question = Question.objects.create(
42         question_text="Future question.", pub_date=timezone.now() + timedelta(days=30)
43     )
44     question = Question.objects.create(
45         question_text="Past question.", pub_date=timezone.now() - timedelta(days=30)
46     )
47     response = self.client.get(reverse('polls:index'))
48     self.assertEqual(response.status_code, 200)
49     self.assertQuerysetEqual(response.context['latest_question_list'], [
50         '<Question: Past question.>'
51     ])
52
53 def test_index_view_with_two_past_questions(self):
54     """
55     Test the index view with two past questions.
56     """
57     question = Question.objects.create(
58         question_text="Past question.", pub_date=timezone.now() - timedelta(days=30)
59     )
60     question = Question.objects.create(
61         question_text="Past question.", pub_date=timezone.now() - timedelta(days=30)
62     )
63     response = self.client.get(reverse('polls:index'))
64     self.assertEqual(response.status_code, 200)
65     self.assertQuerysetEqual(response.context['latest_question_list'], [
66         '<Question: Past question.>'
67     ])
68
69 Statement seems to have no effect (unresolved attribute reference 'test' for class 'QuestionViewTests')
```

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→ "MovieListMaker"



Where you work: Where they work:

How long do you want to travel? How long do they want to travel?

Your preferred mode of transport: Their preferred mode of transport:

Search

<https://cohabio.eu.pythonanywhere.com/>
<https://github.com/haessar/cohabio>

Python dev/analyst in industry

2017 - 2019



Sector	Company	Location	Role	Duties
Digital marketing	Mavens of London (later Kantar)	Holborn, London	Dev team – Python dev	Building scraping and reporting tools
Sustainable energy	Energy Systems Catapult	Birmingham	Interim model analyst	Scripting for data processing and KPI calculation
Finance	JPMorgan Chase	Glasgow	Small cog in a corporate giant	ETL pipelines, Python 2 -> 3 migration



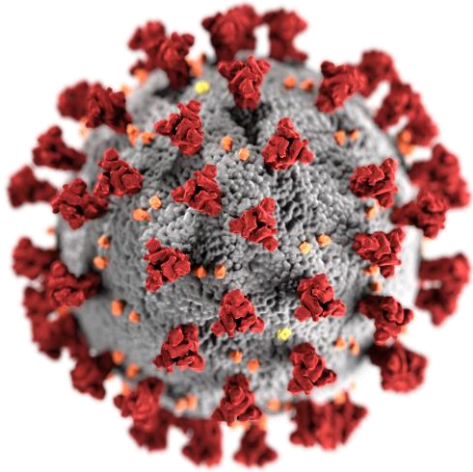
All code proprietary/private



3 months effectively unemployed

Covid and UofE

2020 - 2021



- Remote role
- Central IT rather than academic
- “People and Money” system - ETL pipelines
- Toxic team culture / worst job yet

Alissa Eckert, MS; Dan Higgins, MAM, Public domain, via Wikimedia Commons



- New to parenthood
 - Isolation
 - Low job satisfaction
- = Depression



Uni payment backlog left staff crying - report



Oliver Coe
BBC Scotland News

8 December 2023
Updated 9 December 2023

<https://www.bbc.co.uk/news/articles/cd1p32pd90po>

Entry to UofG

2021 - 2024



School of Infection
& Immunity

Prof Thomas
Otto's lab



COMPANION

Easy and reliable genome annotation.

Annotate *your* sequence!



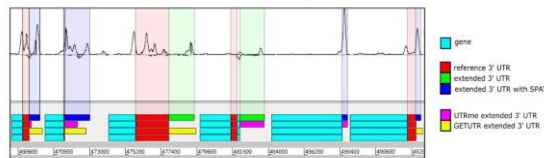
nextflow



- Open-source code
- Publications
- Collegiate culture

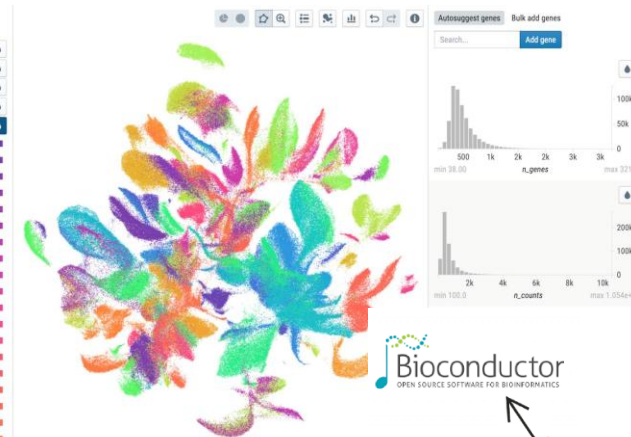
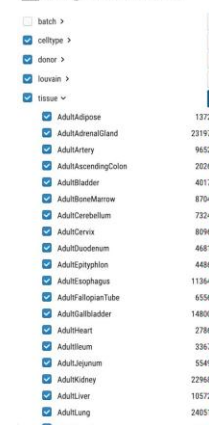


Forward-stranded 3' UTRs extended by several tools



WCIP ISAB/Retreat 2022

cell-gene Human Cell Landscape



paraCell



Bioconductor
OPEN SOURCE SOFTWARE FOR BIOINFORMATICS



Seurat

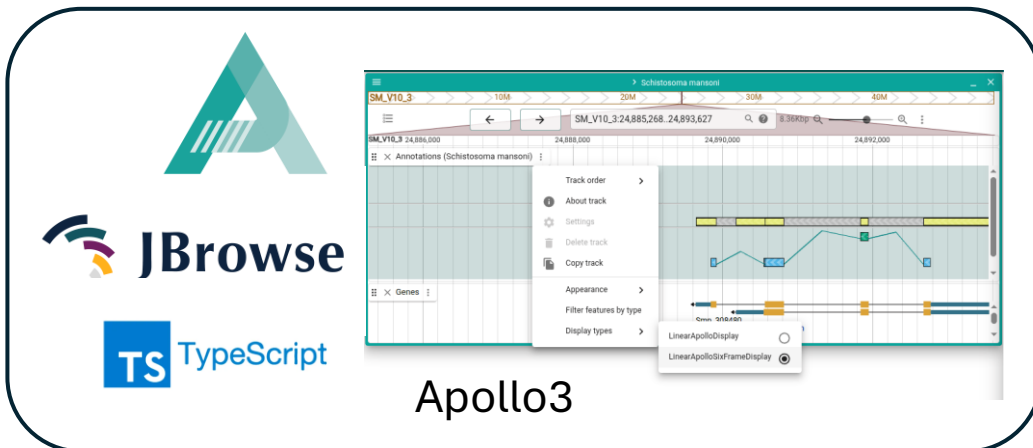
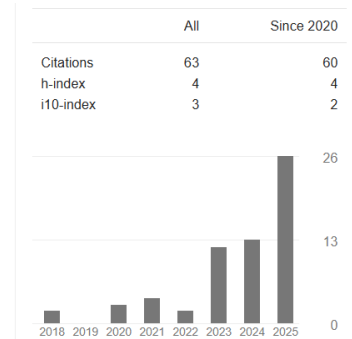
Current RSE role

2024 - Present

- Academic track – permanent contract
 - Lots of autonomy
 - Lots of variety
- = Job satisfaction



CompBio Hackathon 2025



Apollo3



Image credit Ryan Field

Thanks for
listening!

“

My advice to others: don't be afraid to try a variety of roles before settling on something that works for you. There will always be opportunities arising in unexpected areas, and doors reopening that once might have seemed firmly shut.

”

<https://theauditorium.blog/2025/03/12/pathfinder-career-narratives-60-research-software-engineer/>