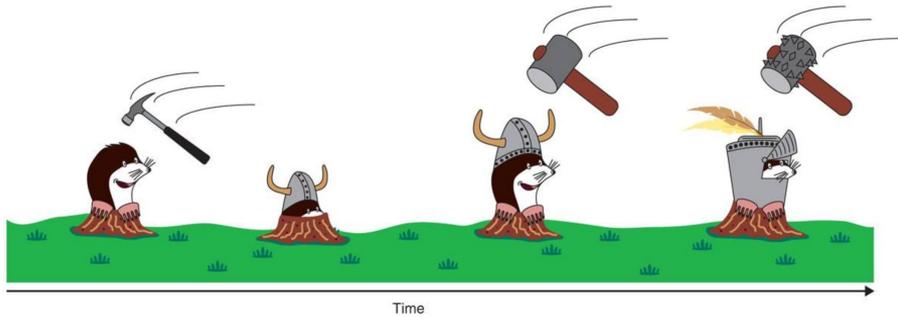
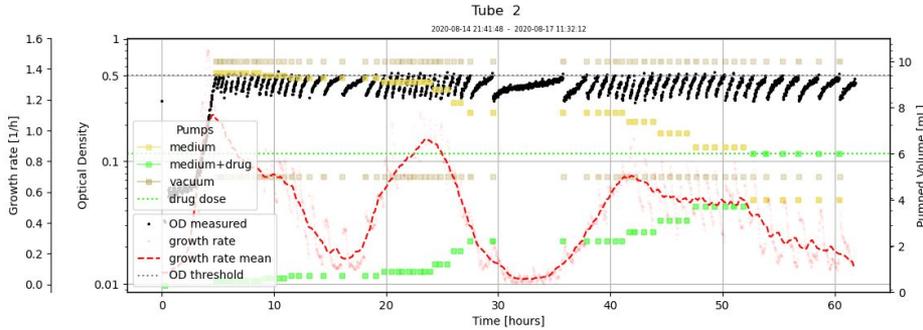
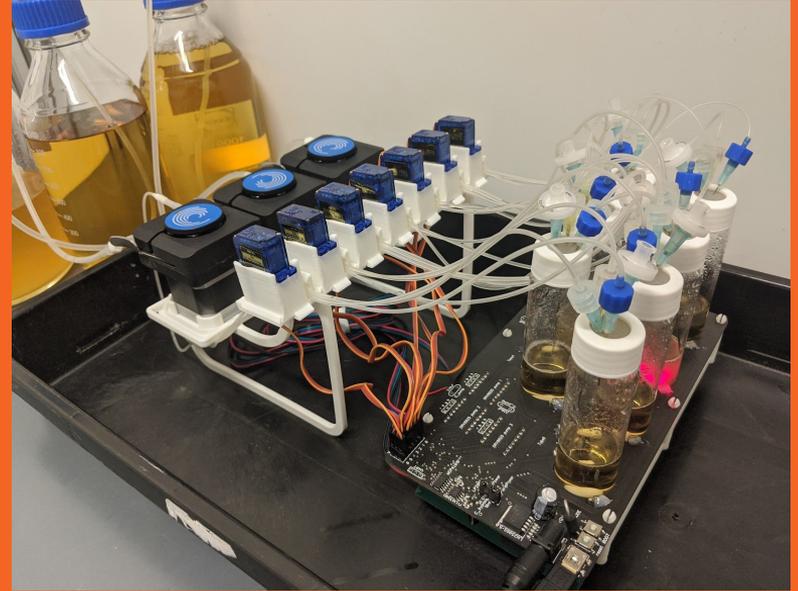


Morbidostat software development



SMTB 2020

Telegram user interface bot

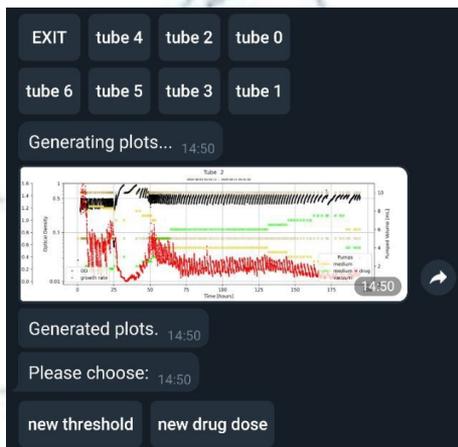
Old interface:

commands have to be typed in.



New interface:

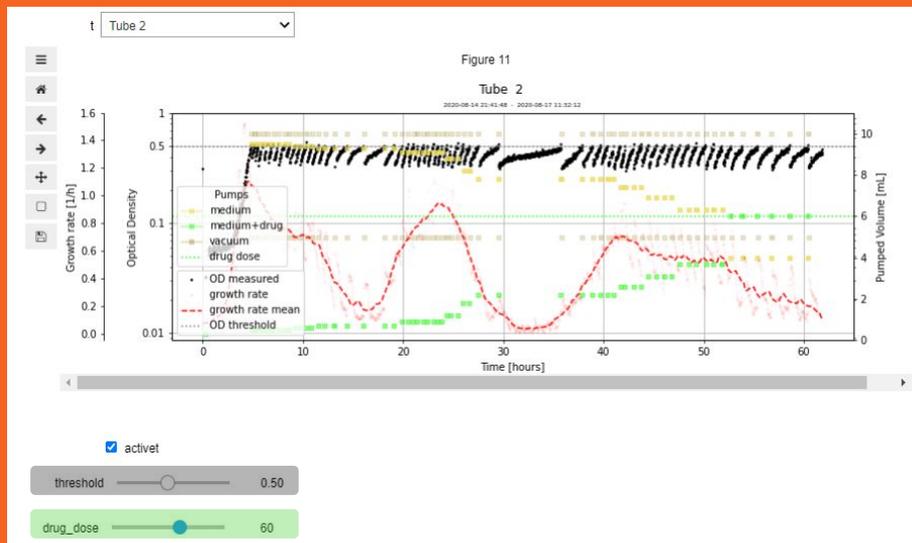
an array of buttons allows the user to adjust various parameters of the experiment with a single tap.



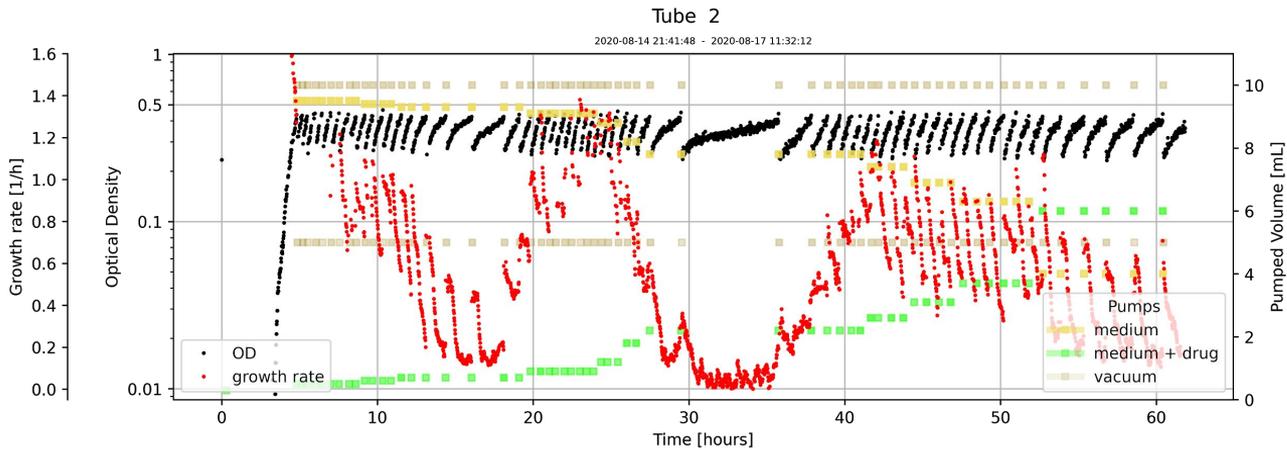
AutoDoser and graphical interface

```
47 hours
lastGR: 0.24966784813355647
GR slope: 0.017402804180857788
last doses: [[3.1]
[3.1]
[3.1]]
dose: 3.1
Drug dose is updated!
```

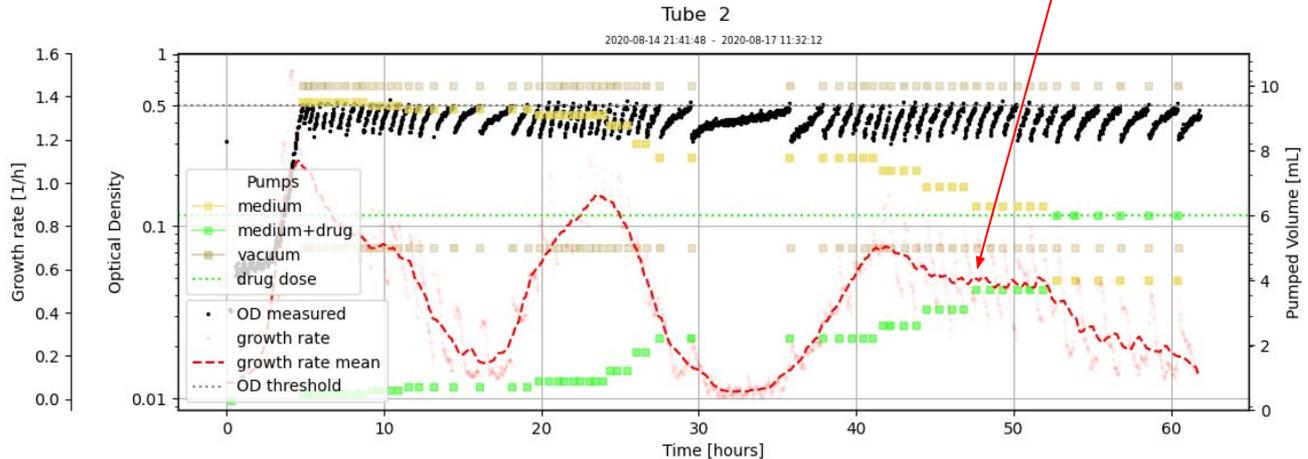
```
Sun Aug 16 18:04:01 2020,Drug dose in tube 4 is updated to new value 33.00
Sun Aug 16 19:51:57 2020,Drug dose in tube 4 is updated to new value 39.00
Sun Aug 16 20:33:02 2020,Drug dose in tube 2 is updated to new value 37.00
```



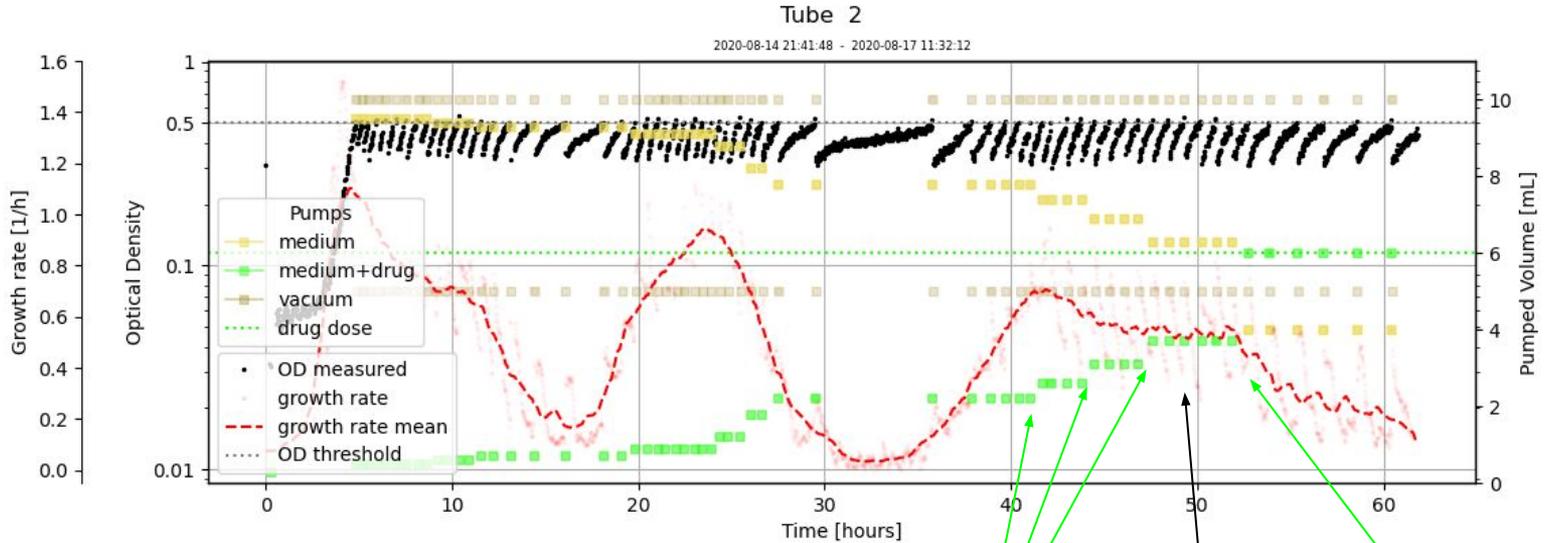
Data processing:



Growth rate measurements are averaged and missing values are interpolated to smooth the data



AutoDoser - an algorithm that automatically tracks the growth rate and changes the drug dose in the vial



algorithm:

if growth rate > GR threshold:

if growth rate slope > GR slope threshold:

if last dose change > 4 dilutions ago:

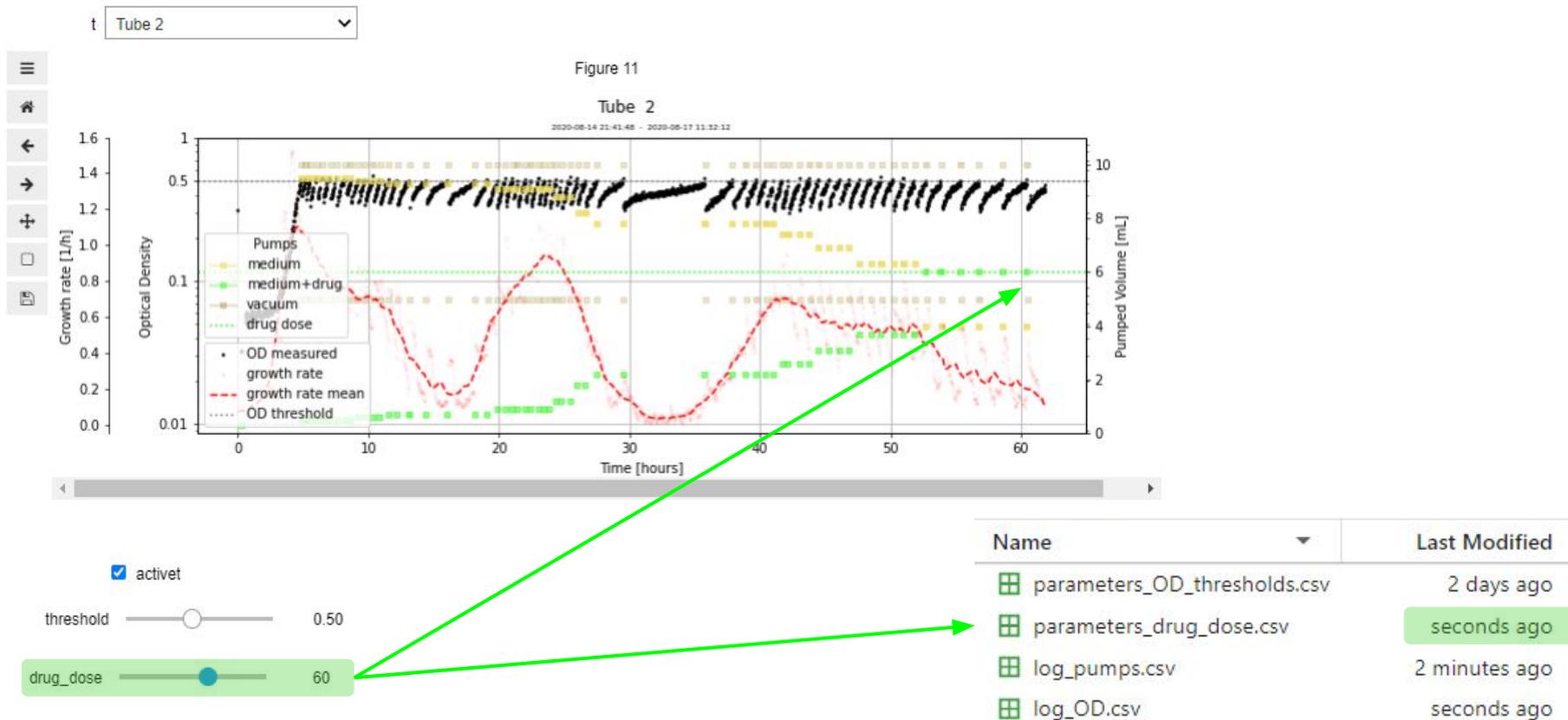
increase drug dose by 20%

Automatic
dose adjustments

Manual
dose adjustment

Algorithm crashed
because of bug

Graphical interface using Jupyter widgets allows to easily change parameters while updating the plot



How to make a telegram bot?



```
es': [], 'photo': [], 'new_chat_members': [], 'new_chat_photo': [], 'delete_chat_photo': False, 'group_chat_created': False, 'supergroup_chat_c
reated': False, 'channel_chat_created': False, 'reply_markup': {'inline_keyboard': [{'text': '1', 'callback_data': '0'}, {'text': '3', 'callba
```

```
for res in res:
    socket.gaierror: NameError
    During handling of the above exception, another exception occurred:
    Traceback (most recent call last):
      File "C:\ProgramData\Miniconda3\lib\site-packages\telegram\ext\updater.py", line 379, in _network_loop_retry
        if not action_cb():
      File "C:\ProgramData\Miniconda3\lib\site-packages\telegram\ext\updater.py", line 340, in polling_action_cb
        allowed_updates=allowed_updates)
      File "<decorator-gen-157>", line 2, in get_updates
      File "C:\ProgramData\Miniconda3\lib\site-packages\telegram\bot.py", line 67, in decorator
        result = func(*args, **kwargs)
      File "C:\ProgramData\Miniconda3\lib\site-packages\telegram\bot.py", line 2138, in get_updates
        result = self._request.post(url, data, timeout=float(read_latency) + float(timeout))
      File "C:\ProgramData\Miniconda3\lib\site-packages\telegram\utils\request.py", line 333, in post
        **urlopen_kwargs)
      File "C:\ProgramData\Miniconda3\lib\site-packages\telegram\utils\request.py", line 248, in _request_wrapper
        raise Conflict(message)
    telegram.error.Conflict: Conflict: terminated by other getUpdates request; make sure that only one bot instance is running
    2020-08-17 19:41:39,487 - telegram.ext.updater - INFO - Received signal 2 (SIGINT), stopping...
    2020-08-17 19:41:42,945 - telegram.ext.updater - ERROR - Error while getting Updates: Conflict: terminated by other getUpdates request
```

such file or

The Overflow

Podcast

Featured on M

CEO Blog

fundraisir

Thank yo

also did not help. Any help is appreciated.

Python version: 3.5.3, current Pillow version: 4.3.0

```
ImportError: libopenjp2.so.7: cannot open shared object file: No such file or directory
a', 'last_name': 'Charchuta', 'edit_date': 1597149642, 'c
_entities': [], 'photo': [], 'new_chat_members': [], 'new_ch
_chat_created': False, 'channel_chat_created': False, 'reply_markup': {'inline_keyboard': [{'text': 'Yes, let's do it again!', 'callback_dat
a': '0'}, {'text': 'Nah, I've had enough ...', 'callback_data': '1'}]}, 'from': {'id': 1376483102, 'first_name': 'testbot', 'is_bot': True, 'u
sername': 'Litwo_ojczyzno_moja_bot'}, 'data': '1', 'from': {'id': 1373325939, 'first_name': 'Mikołaj', 'is_bot': False, 'last_name': 'Charchut
a', 'language_code': 'pl'}}} caused error "'NoneType' object has no attribute 'reply_text'"
2020-08-11 14:44:16,165 - telegram.ext.updater - INFO - Received signal 2 (SIGINT), stopping...
```

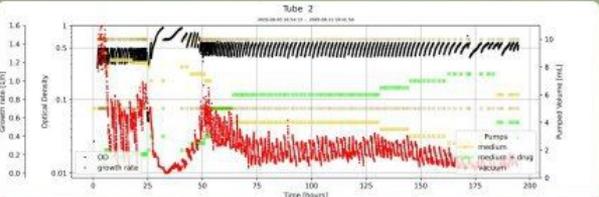
The working bot

Please choose: 2:50 PM

EXIT tube 4 tube 2 tube 0

tube 6 tube 5 tube 3 tube 1

Generating plots... 2:50 PM



Generated plots. 2:50 PM

Please choose: 2:50 PM

new threshold new drug dose

Please wait 2:51 PM

Old thresholds:
[0.5 0.5 0.5 0.5 0.5 0.5] 2:51 PM

parameters_O...resholds.csv
27 B 2:51 PM

S Type in new threshold in tube 2 2:51 PM

/start 19:48 ✓

Please choose: 19:48

Select Tube Plot Gen Photo Raw Signal

Tresholds Last data Volumes Pump data

Please wait 19:48



M

Outlook

Telegram:

→ **Implement the button interface for more operations:**

- basic operations (OD measurement, pumps, valves, stirrers)
- high-level operations (calibration, experiment initialization, etc.)

AutoDoser:

→ **Fine-tuning algorithm parameters**

→ **Adding rescue dilutions**

