* How to start the force clamp software?
* Cantilever Inventory
* Where to find my body mechanics Data

**Recording New Data**

* Open force clamp software (Don’t update Labview)
* Open Patch Clamp software

**How to start the force clamp software?**

* Start FALCON computer
* Password: nemat0de
* Open NI LabVIEW 2013 (32-bit) – DON’T UPGRADE !!!!
* Open C:\Users\Falcon\Desktop\Force Clamp\Current\Force\_Clamp.Ivproj
* (back up versions in my google drive folder and on the Falcon PC)
* Open the following interfaces:
  + Under NI-cRIO-9012-0158E32E (171.65.20.50)
    - Chassis (cRIO-9113
      * FPGA Target 3 (RIO0, cRIO-9113)
        + FPGA\_Main.vi (START THIS ONE FIRST. CLICK ON THE WHITE ERROR)
        + Typical PGain for my experiments: 0.01
        + Typical IGain for my experiments: 15
        + Typical DGain for my experiments: 0.01
        + But you should calculate and adjust the gains for each cantilever (see scanned pdfs for description)
        + antiWindUpInterval: 5
      * RT\_main.vi
      * Main.vi (RUN WHITE ARROW AND CONNECT)
* IP address (dynamic?)
* Under experimental procedure:
  + Exp name
  + Cantilever ID
  + Sensitivities of Actuator
  + Cantilever sensitivity (find in spreadsheet inventory)
  + Cantilever stiffness (find in spreadsheet Inventory)
  + You can change and update the gains here
  + I recorded everything in displacement clamp
  + (the acquisition frequency doesn’t matter that much, as I record the samples with patchmaster, probably better to run it at 10kHz)
* Wavetable:
  + Create new protocols if you want
  + I have a sheet with protocols next to the computer.
  + If you want to create a new protocol you first need to choose a protocol, and reset it (numbers 1 & 2, and 8 & 10 I used the most common, maybe start by replacing 17 or 18).
  + Press reset
  + Choose your waveform
  + Add to protocol
  + Save protocol
  + Quickly!!! Choose the one you want to replace and save (this step is time limited. Make sure you write down your protocol in case you need to reproduce again)
* Protocols:
  + You can run the protocols you save
  + For example, press on Number 1
  + 3x5 different sizes of Steps are applied = total 15
  + Choose trigger: per stimulus
  + Download
  + You can now (if you want to analyze with my matlab code), trigger the protocols with patchmaster (see below) or if you press actuate, you trigger one stimulus
  + If you look at the right into the RT\_main.vi field, you can see how many waves are still left.
  + Protocol 1: steps: 1, 3, 6, 9, 12 micrometer
  + Protocol 2: steps: 0.5,2,5,8,11 micrometer
  + Protocol 5: steps: 1.5, 4, 7, 10, 12.5 micrometer
  + Protocol 8: Steps 8 um (for IV curves)
  + Protocol 10: Steps backwards from 12 to 0.5 (15 steps) (for IV curves)
  + Go to “Trigger protocol via Patchmaster”

Trigger protocol via Patchmaster

* Open patchmaster
* Download protocols in forceclamp setup into wavetable
* Run the pgf file FiveStep
* Wait until finished and run 2 more times (you can write a protocol to automatically repeat, it somehow got deleted).
* The black trace (trace 1) records the current
* The red trace (trace 2) records the actuator setpoint
* The blue trace (trace 3) records the actuator signal
* The green trace (trace 4) recors the cantilever signal

**Cantilever Inventory**

* Shared google drive for cantilever inventory: email me: [fechnersy@gmail.com](mailto:fechnersy@gmail.com) if you don’t have access
* Most are based on the design forom Eileen: EM-NH (and listed under this tab in the sheet)
* Functional cantilevers are in the drawer next to the setup (we have 18 functional ones)
* !!!!!! IMPORTANT !!!!! You have to add nail polish to the connectors, otherwise the cantilever will break the moment there are dipped into XM2 saline !!!!!!!

**Where to find my body mechanics Data**

* Here: /FALCON-Ephys/FALCON-BodyMechanicsBOM
* All matlab scripts & dat.files & sigTOOL Folder and Sammy’s scripts for import are within the FALCON-BodyMechanicsBOM folder
* Or clone the git repository

1. MetaData of worm length, including stiffness values are in BOM-Meta-Data (BOM= BodyMechanics); most relevant Data are highlighted in green
2. IgorFile contains so far only the Stiffness Values for each worm
3. Csv. Files “IndAndForceValues” contain the Indentation vs Force Data, which I used to obtain the Stiffness (calculated in MATLAB:  StiffnessWorm = MeanIndentationVer\MeanForceVer perfoms a least square Fit, constrained to 0)
4. Csv.files traces contains the original traces
5. The Main MatlabScript is called BOMDisplaceClamp.m. If you open a .mat File (e.g. FALCON-BodyMechanicsBOM/matlabFiles-2percent/FiveStep-BOM002.mat); I used 15 different Indentations. divided into blocks a Five) you should be able to run it. It is divided into five parts. To only look at and follow my analysis, you are only interested in part 3 and 4.
   1. Load .dat Files
   2. Load Meta-data sheet
   3. Analyze Data
   4. Make figure to control signals
   5. Export Data