Text-Fabric / Research-Workshop-Series



## Introduction: See my PhD Colloquium Speech (next week) ;-)

## Setting up your workbench

The most efficient way of working with Biblical Hebrew texts is by using *three* **tools**:

### Tool **Function** great for looking up dictionaries, commentaries, and annotating your text (notes, highlighting, The Library: commerical BibleSoftware (Logos, Accordance) etc.) The Text with linguistic annotations on all language levels (phonology, morphology, syntax, text-grammar): great for understanding the linguistic structure of a text and registering database codes useful OT: SHEBANQ for building queries NT: Cascadia Syntaxtrees (Asian Bible Society) The Analytic Tool-Kit: Text-Fabric (i.e. SHEBANQ-query-tool on steroids) great for turning your exegetical questions into queries AND for analyzing your query results

# The Text

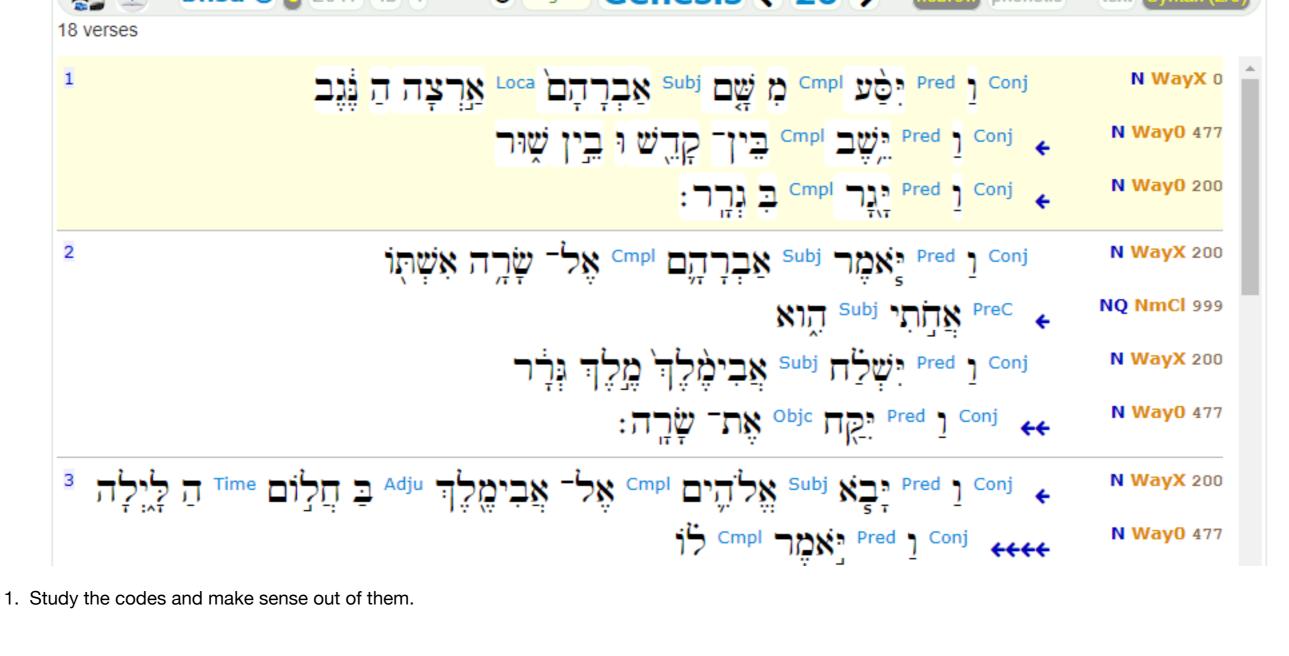
# **OT: SHEBANQ**

Lets pull up Gen 20 in SHEBANQ. Do the following:

2. Click on "Text" in the upper left corner

Go to https://shebanq.ancient-data.org/

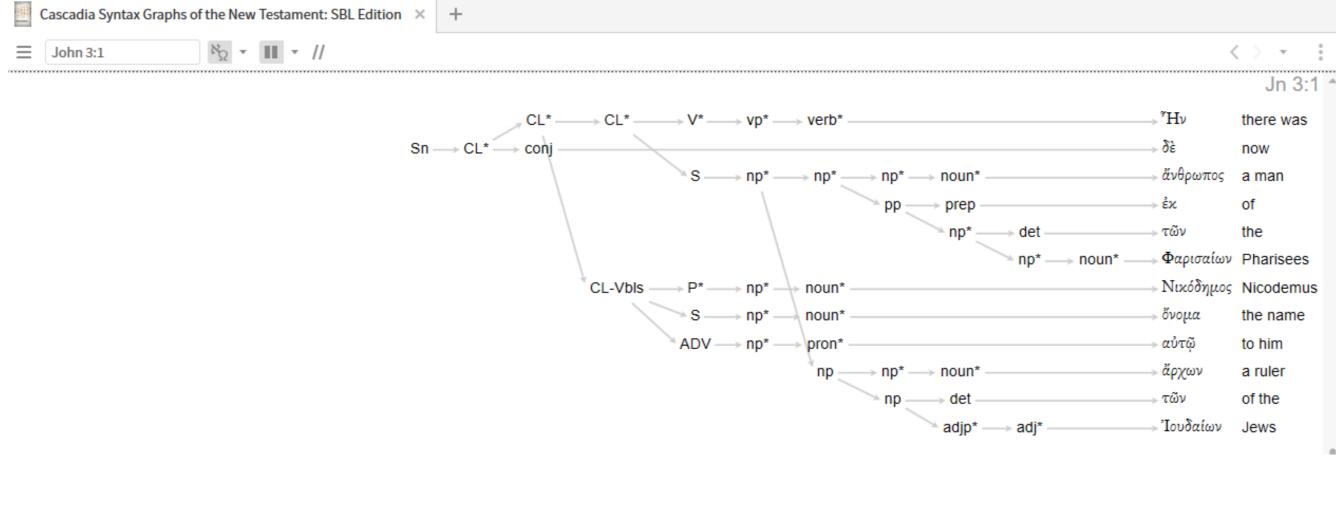
- 3. Maneuver to Gen 20
- 4. Visualize the text-grammatical structure of Gen 20 by clicking on the "Notes (1/3)" button until it shows "Syntax (2/3)". You should see something like this:
- 6 English Genesis ← 20 → **bhsa 1 2** 2017 4b 4



NT: Cascadia Syntaxtrees (Logos)

Lets pull up John 3:1 in Logos.

## Cascadia Syntax Graphs of the New Testament: SBL Edition X +



### 1. You need the engine that allows to (1) display texts, (2) run queries, (3) analyse query results, (4) visualize insights. That engine is the Anaconda Python Research Environment. This research environment is used by almost all data scientists, computer analysts, and researchers in the digital humanities. 2. Download and install Anaconda from here: https://www.anaconda.com/products/individual:

The Analytic Tool-Kit

**TextFabric** 

1. Open the Anaconda Command line:

Q verse pad

Matthew 1:1

Matthew 1:2

Help

JeremiahX = book book=Jeremia

Jeremiah 37

Jeremiah 37

chapter chapter=36|37|38|39|40

JeremiahX = A.search(JeremiahX)

clause typ=WayX

phrase function=Pred

word sp=verb lex\*

וַ יּאמֶר יִרְמְיָּהוּ

וַ יָּאמֶר יִרְמְיָּהוּ

וַ יַּשֶׁב־ שָׁם יִרְמָיָהוּ יָמָים רַבְּים: פ

וַ יָּאמֶר יִרְמְיָּהוּ אֶל־ הַ מֶּלֶךְ צִּדְקַיָּהוּ

A.table(JeremiahX, start=4, end=16, condensed=False, colorMap={2: 'red', 3: 'blue', 6: 'yellow', 8:'pink'})

יְרְמְיָהוּ יִּלְשֶׁב־ יִרְמְיָהוּ יִרְמְיָהוּ

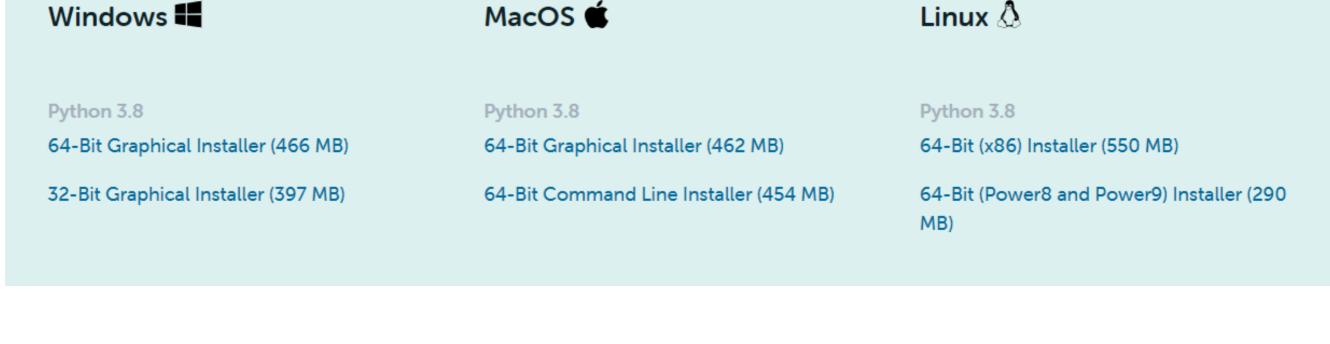
יְּאמֶר יָּאמֶר יִרְמְיָהוּ יִרְמְיָהוּ

יִרְמְיָּהוּ יִרְמְיָהוּ יִרְמְיָהוּ יִּרְמְיָהוּ

pip install text-fabric

**Anaconda** 

Choose the 64bit installer. If you are not a programmer chose the Graphical Installer option:



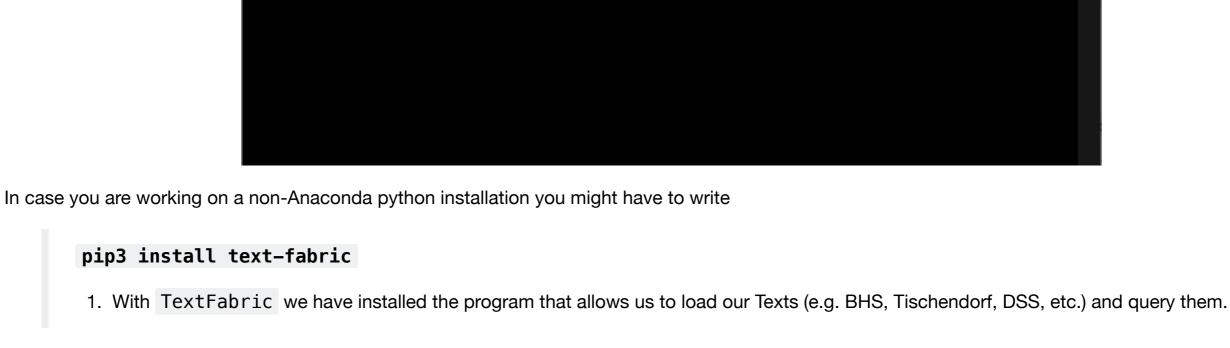
Anaconda Prompt (anaconda3)

(base) C:\Users\Oliver Glanz>pip install text-fabric\_

As we have installed Anaconda we can now install the TextFabric program (https://annotation.github.io/text-fabric) into the Anaconda environment.

🗏 Anaconda Prompt (anaconda3)

2. type the following command and execute it by pushing "enter" on your keyboard



Βίβλος γενέσεως Ίησοῦ Χριστοῦ υἰοῦ Δαυείδ υἰοῦ Άβραάμ.

Δαυείδ υίοῦ

mood=

nu=sg

voice=

sp=noun

mood=

sp=noun

voice=

nu=

Άβραάμ.

mood=

sp=noun

voice=

nu=

Βίβλος γενέσεως Ίησοῦ Χριστοῦ υἱοῦ

mood=

nu=sg

voice=

sp=noun

mood=

nu=sg

voice=

 $sns.lmplot(x="R", y="S3", data=JeremiahX, hue='lex7', height=5, aspect=2/1, fit\_reg=False, scatter\_kws={"s"}: 200{})$ 

sp=noun

mood=

nu=sg

voice=

sp=noun

1. There are two ways to open a text A. either by using the **TF browser** 

 $\blacksquare$ 

27 books

Matthew

Mark

type to filter ...

```
Q node pad
                                                                                            vt=
                                                                                                              vt=
                                                                                                                              vt=
                                                                                                      vt=
                                                                                                                      vt=
                                                Luke
                                                 John
        100,101,102
                                                                          2 Άβραὰμ ἐγέννησεν τὸν Ἰσαάκ, Ἰσαὰκ δὲ ἐγέννησεν τὸν Ἰακώβ, Ἰακώβ δὲ
                                                 Acts
                                                                        έγέννησεν τὸν Ἰούδαν καὶ τοὺς ἀδελφοὺς αὐτοῦ,
                                                Romans
    Jobs
                                                1 Corinthians
                                                                        2 Corinthians
                                                                        τὸν Έσρώμ, Έσρὼμ δὲ ἐγέννησεν τὸν Ἀράμ,
                                                               10
                                                 Galatians

    Αρὰμ δὲ ἐγέννησεν τὸν Ἀμιναδάβ, Ἀμιναδὰβ δὲ ἐγέννησεν τὸν Ναασσών,

                                                               11
                                                Ephesians
         Q search pad
                                                                        Ναασσών δὲ ἐγέννησεν τὸν Σαλμών,
                                                               12
                                                 Philippians
                                                                              Σαλμών δὲ ἐγέννησεν τὸν Βόες ἐκ τῆς Ῥαχάβ, Βόες δὲ ἐγέννησεν τὸν Ἰωβὴδ ἐκ
         book book=Matthew
                                                               13
                                                 Colossians
                                                                        τῆς Ῥούθ, Ἰωβὴδ δὲ ἐγέννησεν τὸν Ἰεσσαί,
    Options
          chapter chapter=1
                                                              14
                                                 1_Thessalonians

Ιεσσαὶ δὲ ἐγέννησεν τὸν Δαυείδ τὸν βασιλέα. Δαυείδ δὲ ἐγέννησεν τὸν Σολομῶνα

           verse verse=1
                                                               15
                                                2_Thessalonians
                                                                        έκ τῆς τοῦ Οὐρίου,
                                                               16
                                                1_Timothy
                                                                        Σολομών δὲ ἐγέννησεν τὸν Ῥοβοάμ, Ῥοβοὰμ δὲ ἐγέννησεν τὸν Ἀβιά, Ἀβιὰ δὲ
                                                               17
                                                2_Timothy
                                                               18
                                                                        έγέννησεν τὸν Ἀσάφ,
                                                Titus
                                                               19
                                                Philemon
                                                                        Κατάφ δὲ ἐγέννησεν τὸν Ἰωσαφάτ, Ἰωσαφάτ δὲ ἐγέννησεν τὸν Ἰωράμ, Ἰωράμ δὲ
                                                              20
                                                Hebrews
                                                                        έγέννησεν τὸν Ὁζείαν,
                                                              21
                                                 James

    Οζείας δὲ ἐγέννησεν τὸν Ἰωαθάμ, Ἰωαθὰμ δὲ ἐγέννησεν τὸν Ἀχάζ, Ἀχὰζ δὲ

                                                              22
                                                1_Peter
                                                                        έγέννησεν τὸν Έζεκίαν,
                                                              23
                                                2_Peter

    Έζεκίας δὲ ἐγέννησεν τὸν Μανασσῆ, Μανασσῆς δὲ ἐγέννησεν τὸν Ἀμώς, Ἀμὼς

                                                              24
                                                1_John
                                                                        δὲ ἐγέννησεν τὸν Ἰωσείαν,
                                                              25
                                                2_John

    Ιωσείας δὲ ἐγέννησεν τὸν Ἰεχονίαν καὶ τοὺς άδελφοὺς αὐτοῦ ἐπὶ τῆς μετοικεσίας

                                                              26
                                                3_John
                                                                        Βαβυλῶνος.
                                                              27
                                                Jude
                                                                              μετὰ δὲ τὴν μετοικεσίαν Βαβυλῶνος Ἰεχονίας ἐγέννησεν τὸν Σαλαθιήλ,
                                                              28
                                                Revelation
                                                                        Σαλαθιὴλ δὲ ἐγέννησεν τὸν Ζοροβάβελ,
                                                                               7000 βάβελ δὰ ἀνάμησου τὰν ¾ βιανίδ ¾ βιανίδ δὰ ἀνάμησου τὰν Ἐλιακείνι
   advantage: opens quickly, runs queries fast, minimum of commands necessary
   disadvantage: analysis of query results with python/pandas not possible, no visualisations of query results possible
B. or by using a jupyter notebook
```

ax = plt.gca()

ax.set\_ylabel('verse number')

Text(0.5, 20.80000000000000, 'squence of query results')

oldbabylonian

phrase subj NP

subs

art | prep

god(s)

phrase pred vp

בָּרָא

verb

create qal

perf

subs

heavens

conj

<object marker> | and

Matthew 1:1

mood=

nu=sg

sp=noun

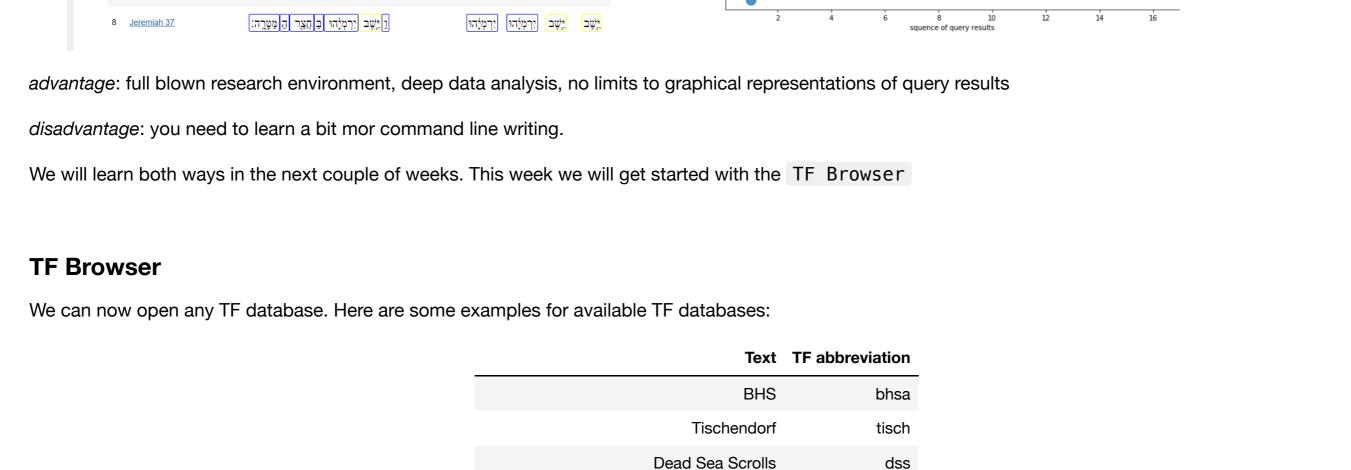
voice=

mood=

nu=sg

voice=

sp=noun



Old Babylonian Letter corpus (cuneiform)

text-fabric followed by TF database abbreviation

Help

2. type the command

In order to open your TF browswer you have to:

1. open the Anaconda command line

For example: text-fabric bhsa

Genesis 1:1

Q node pad

100,101,102

1. Now your webbrowser will open and show the following: Q verse pad

type to filter ...

39 books

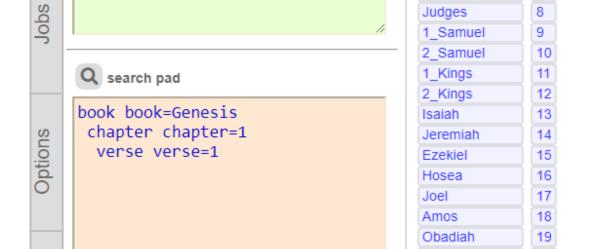
Genesis

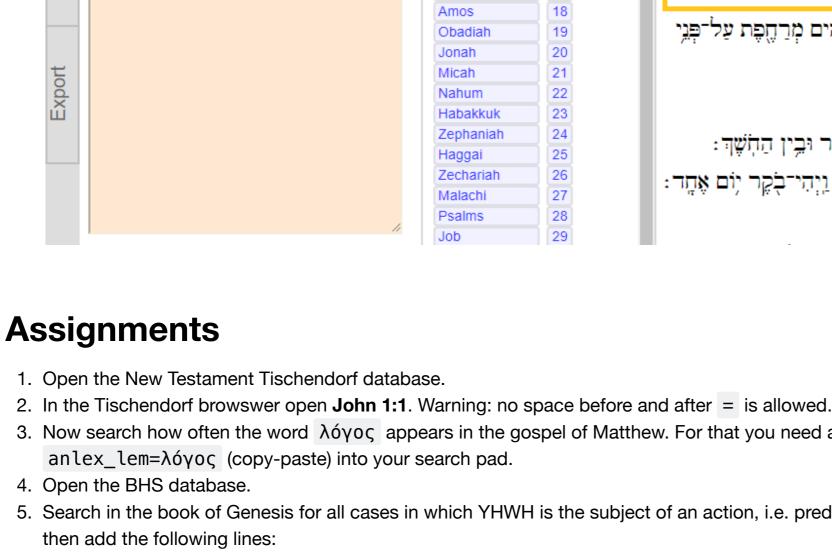
Exodus

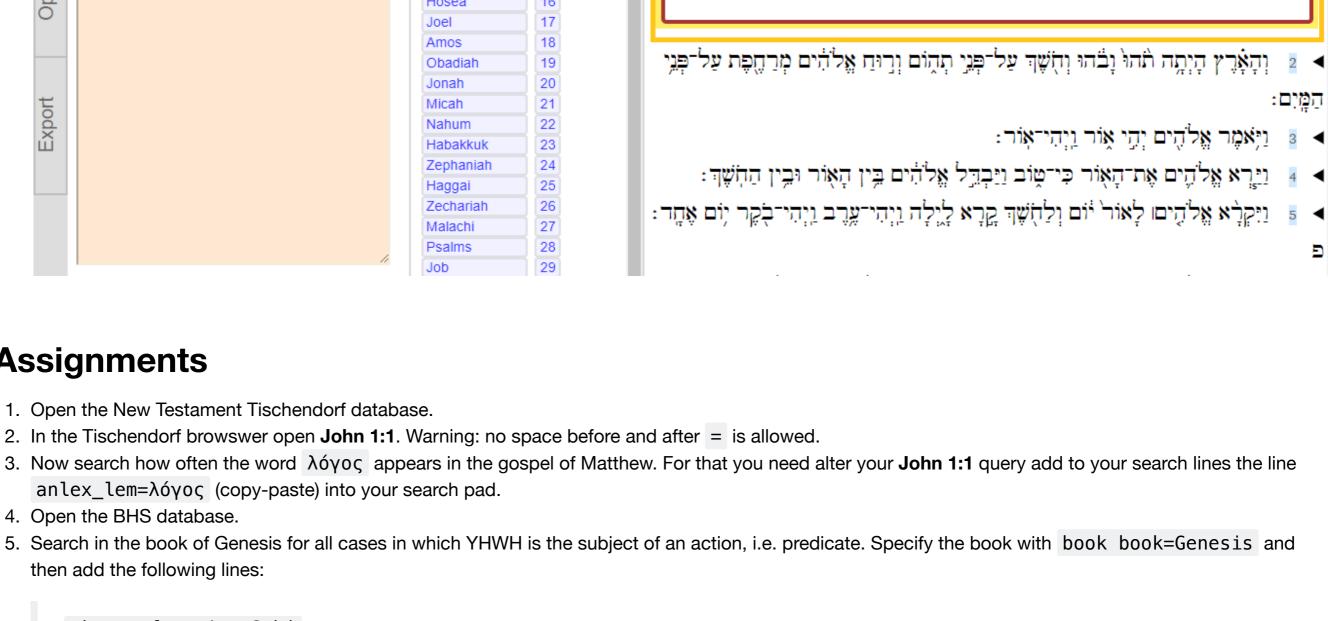
Leviticus

Joshua

Deuteronomy







clause xotx

phrase time PP

phrase objc PP

ΠX

רַאשָׁית

beginning in

subs

art

word lex=JHWH/

2. Run simple Queries on both the BHS and Tischendorf texts.

5. We will visualize our data as bars, pies, and scatters.

3. We will export our query results into a pandas friendly TSV file. 4. We will analyze our query results with python and pandas tools.

phrase function=Subj

- phrase function=Pred
- Whats next?: Jupyter Notebooks!

1. We will run Jupyter Notebooks.

word lex\*