

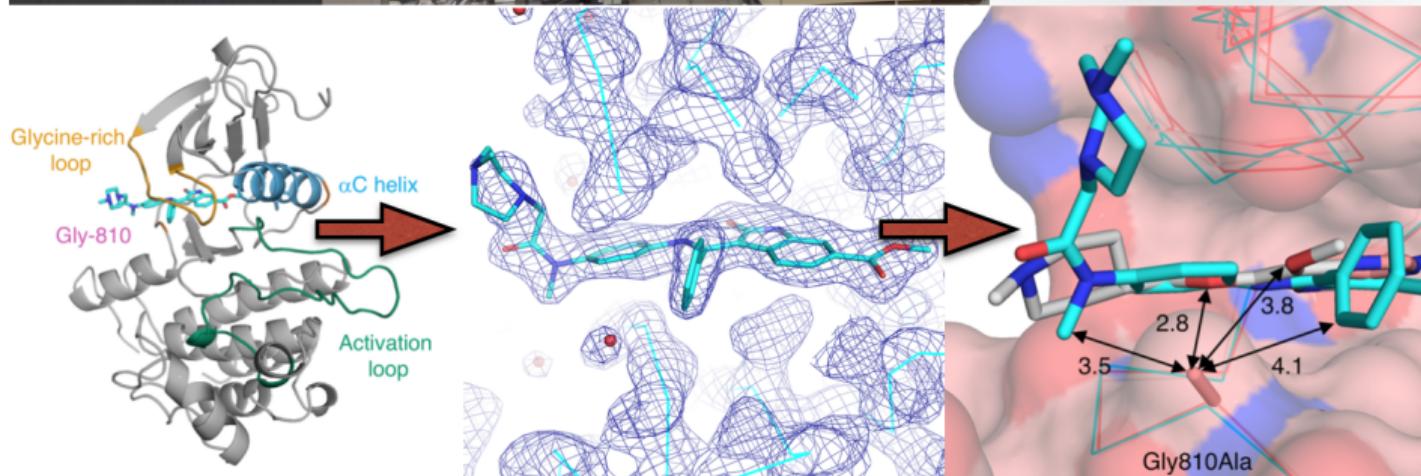
Voice Computing with Python in Jupyter Notebooks

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PyTexas
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Lab's workflow



Python tools

- Mooers,B.H. (2016) Simplifying and enhancing the use of PyMOL with horizontal scripts. Protein Science, 25, 1873–1882.
- Mooers,B.H. (2020) Shortcuts for faster image creation in PyMOL. Protein Science, 29, 268–276.
- Mooers, B. H. M. (2021) A PyMOL snippet library for Jupyter to boost researcher productivity. Computing in Science and Engineering. 23(2) 47-53.
- Mooers, B. H. M. and Brown, M. E. (2021) Templates for writing PyMOL scripts. Protein Sci. 30(1):262-269
- Mooers, B.H.M. (2021). Modernizing computing by structural biologists with Jupyter and Colab. Proceedings of the 20th Python in Science Conference (SciPy2021).
- Mooers, B.H.M. (2023) Biomolecular crystallographic computing with Jupyter. In Agarwal, M., Calloway, C., Niederhut, D. (eds), Proceedings of the 22nd Python in Science Conference (SciPy2023). pp. 32–39.

The problem



deepai.org prompt: Structural biology professor working at his computer while overwhelmed with a large number of parallel writing projects.

Health-related motivations

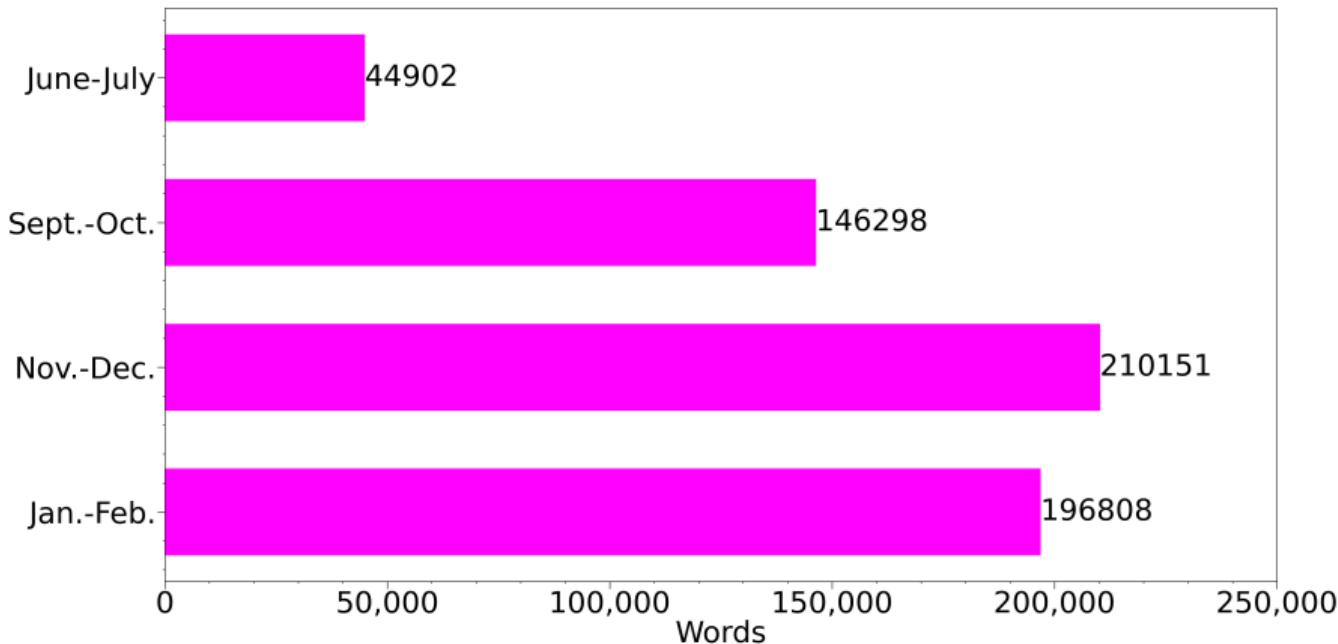
- Suffer from chronic repetitive stress injury (RSI).
- Have impaired use of hands or eyes.
- Want to avoid sitting all day.
- Tired of typing but want to continue working.

Three kinds of voice-computing activities

- Speech-to-text
- Speech-to-commands
- Speech-to-code

“In God we trust. All others must bring data.”

W. Edwards Deming (1900-1993)



Common errors during transcription

- Wrong words inserted
- Omitted words
- Added words

Voice In Plugin for Chrome and Edge



Voice In

Sites

Notepad

Support

Pricing

My Account ▾

INSTALL

Get the #1 Speech-To-Text Chrome Extension.

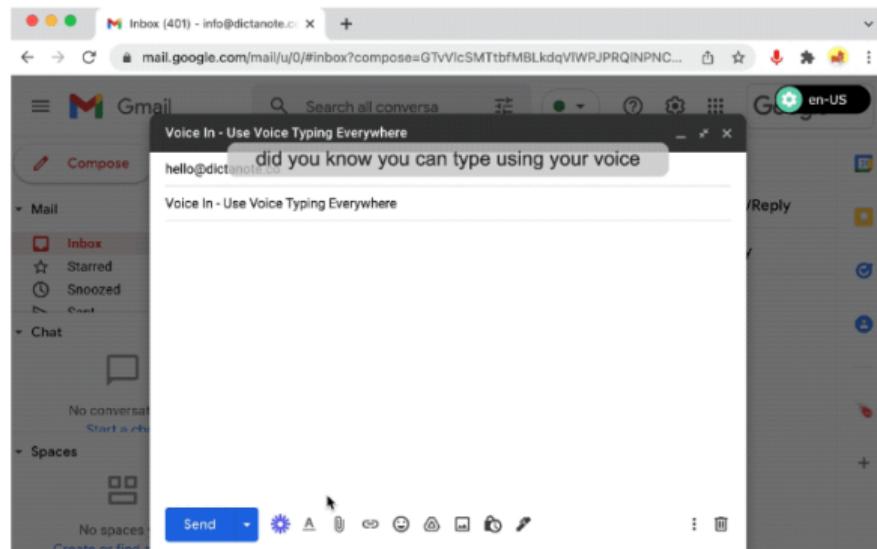
Use your voice to type on [over 10,000 websites](#) in [50+ languages](#). Voice In transcribes your speech to text in real-time.

Trusted by 300,000+ users. Get it now for free.

★★★★★ 1 Rated 4.5/5 out of 2000+ reviews



[ADD TO CHROME →](#)



Custom Commands

Enhance your experience with custom voice commands. These allow you to correct dictation errors, automate repetitive text entries, and perform actions like changing the dictation language, pressing keyboard shortcuts, etc.

For more information, [read our guide on using custom voice commands](#).

[**+ Add Command**](#)[**Bulk Add**](#)[**Export**](#)[**Sync**](#)

Say This	To Insert This	
'cause	because	
'cuz	because	
'twas	it was	

<https://github.com/MooersLab/voice-in-plus-contractions>

Text replacements (1/2)

Text Replacement

Edit Voice Command

Say This

To Insert This

Match within a word

Edit

Insert code: <internal command>

Edit Voice Command

Say This

To Insert This

Match within a word

Edit

Text replacements (2/2)

Insert multi-line code chunks

Edit Voice Command

Say This

To Insert This

```
\begin{itemize}
\item <capitalise>
\item <capitalise>
\item <capitalise>
\item <capitalise>
\end{itemize}
```

Match within a word

Edit

Expand acronyms

Edit Voice Command

Say This

To Insert This

Match within a word

Edit

Homemade Voice-In commands

- **expand** acronyms
- **the book title**
- **email** dsw (insert list of e-mail addresses)
- **insert** code blocks (including equations in LateX)
- **list** (e.g., font sizes in latex, steps in a protocol)
- **open** webpage (e.g., open pytexas)
- **display** equation in display mode
- **inline** equation in-line

<https://github.com/MooersLab#voice-computing>

Jupyter notebooks

```
[4]: Image(filename = PATH +"dssrBlock2.png", width=500, height=500, unconfined=True)
```

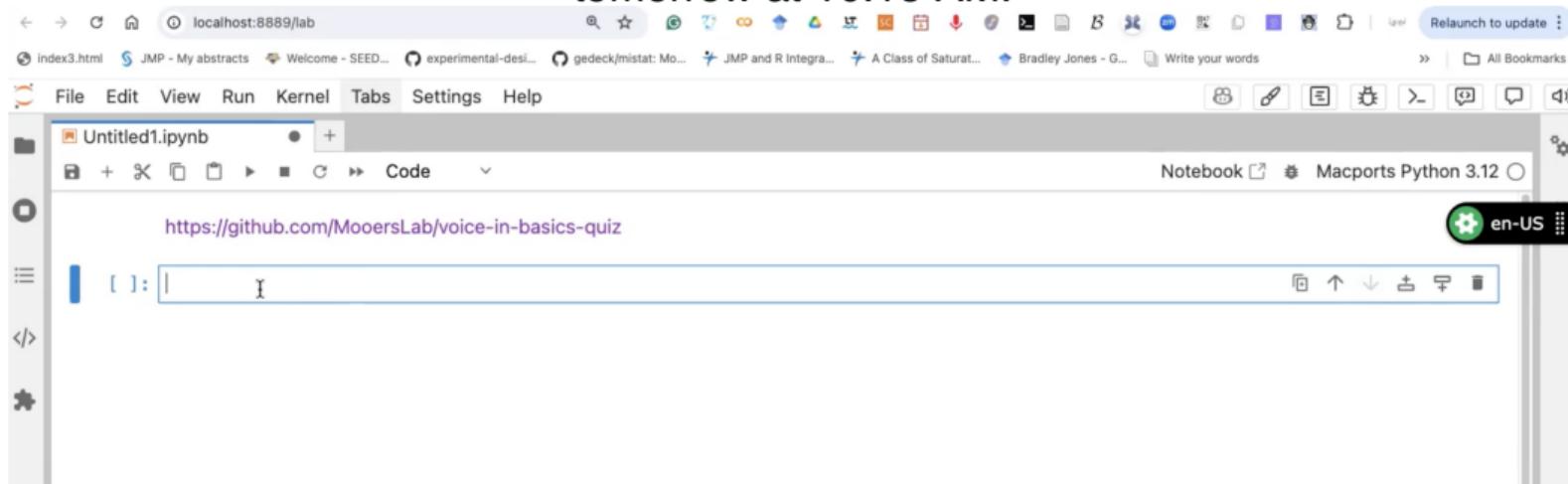
Last executed at 2020-09-20 19:15:52 in 17ms

```
[4]:
```



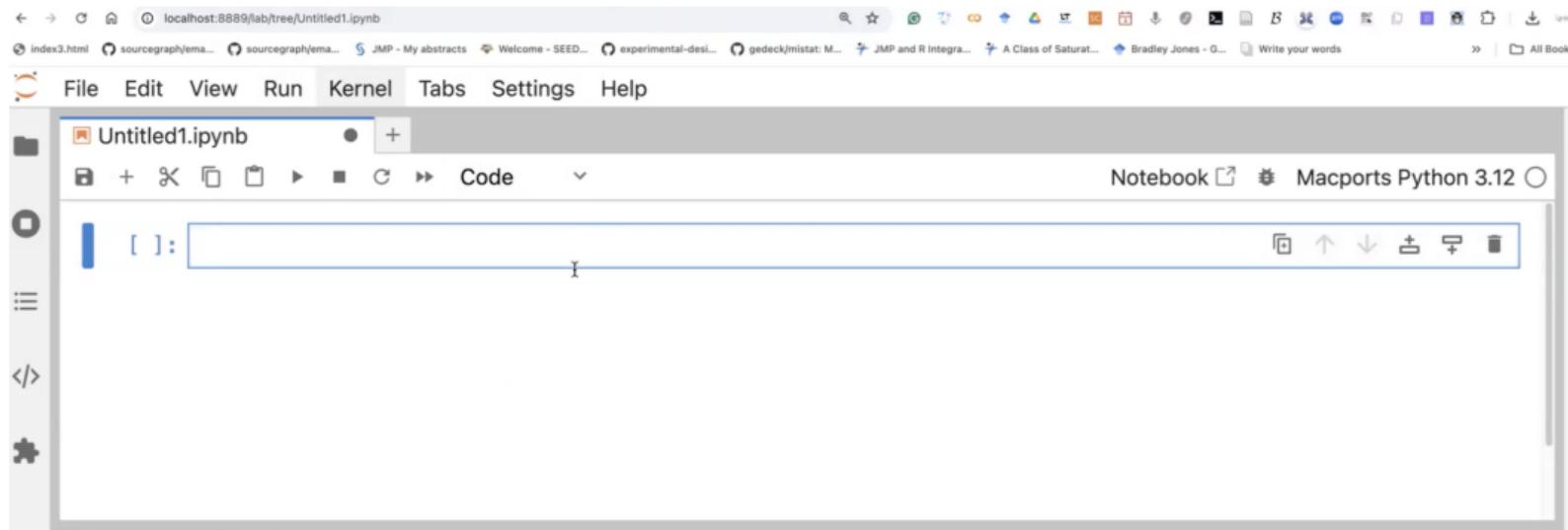
Demo: Interactive quiz

Inspired by *Automate the Boring Stuff with Python* by Al Sweigart who speaks tomorrow at 10:15 AM.



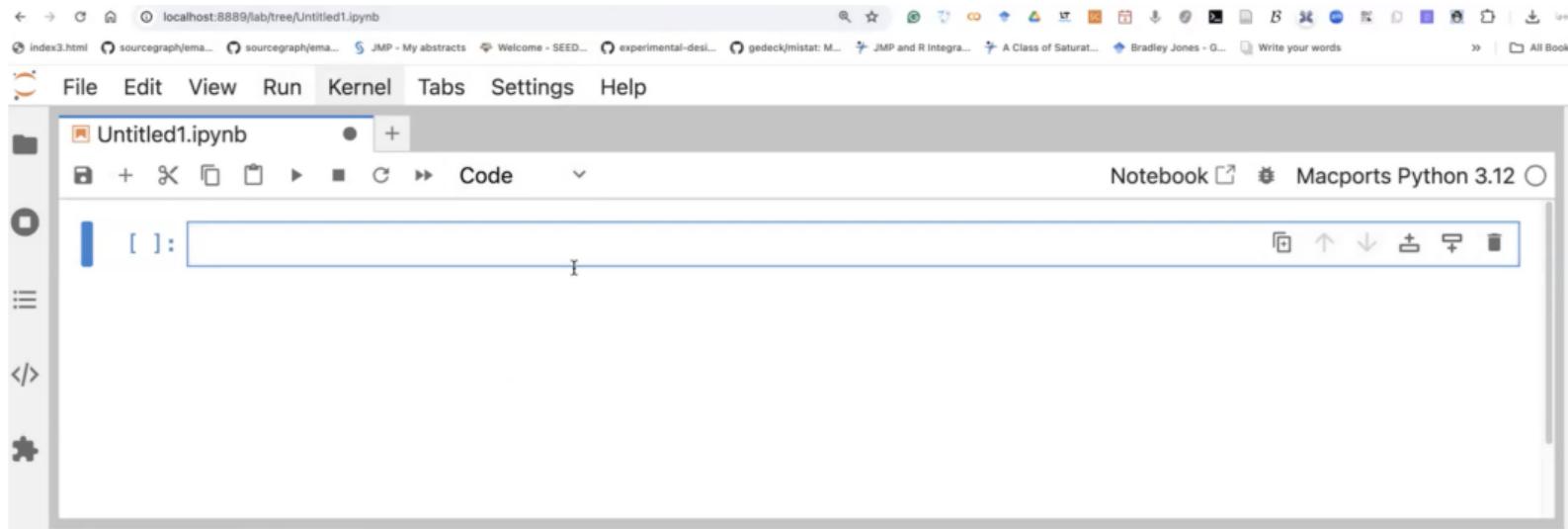
<https://github.com/MooersLab/voice-in-basics-quiz>

Demo: Markdown cell



MooersLab/markdown-jupyter-voice-in

Demo: Code cell



Hazards of using voice commands

- Accidental recording of a conversation with walk-in visitor..
- Accidentally dictate into an open code cell.
- External microphone blocks internal microphone.
- Clashes between two active Automated Speech Recognition software packages.

Other software not covered in this talk

- Nuance's **Dragon Naturally Speaking** (\$699, Windows).
- **Talon Voice** (free, Python driven, tinker's paradise)
- **Serenade** (free, looks interesting for Speech-to-commands and Speeh-to-code)
- Open AI's **whisper**.
- MicroSoft Word's **Dictation** under edit pulldown.
- mac OS's **Dictation and Voice Control**
- Voice recognition in medical dictation (e.g., **Deep Scribe**).
- Digital assistants like **Siri** and **Alexa**.

Summary

- >3-fold increase in generative writing via dictation.
- Speech-to-text to ease writing prose
- Speech-to-commands to open and navigate notebook
- Voice snippets to insert code in markdown and code cells

Acknowledgements

Students Friends and mentors:

- Oklahoma Data Science Workshop
- EmacsConf, Austin Emacs Meetup, Berlin Emacs Meetup

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- NIH: P30 CA225520 (PI: R. Mannel); P20GM103640 and P30GM145423 (PI: A. West)

Start day with Write Honey (writehoney.com)

The screenshot shows a browser window with the URL app.writehoney.com/write. The page has a purple header bar with icons for microphone, pen, and history, and a dropdown menu for session selection. Below the header is a toolbar with buttons for '1 day streak', '61 words', and a yellow 'Save' button. The main content area contains a text input field where the user has typed: "For which I activate with a optional key which is highly configurable and you can see that it is recording my texts I talk. I do have to mention the punctuation as I go. But it does a pretty good job recording my words and translating them into the correct words." A small icon of a person speaking is visible next to the text input.

For which I activate with a optional key which is highly configurable and you can see that it is recording my texts I talk. I do have to mention the punctuation as I go. But it does a pretty good job recording my words and translating them into the correct words.

I am now going to use a voice command oops

Our other fun uses of Jupyter notebooks

- Generating plots of data with matplotlib.
- Using as a REPL to develop and debug code.
- Drafting notebooks for use in Colab.
- Exploring the features of a software package.
- Running interactive quizzes for self-study.
- Playing with other programming languages like R, Julia, Clojure, C++ and Fortran. (Yes, interactive fortran via Ifortran!)