









4th 2017/18 GouTP @ SCEE

- *About:* Introduction to Jupyter notebooks
- *Date:* 8th of March 2018 
- *Who:* Lilian Besson 

Open source content ?

Note: slides are online: github.com/Naareen/slides/tree/master/2018_03__Jupyter_notebooks_are_awesome__GouTP_at_Supelec

What's a "GouTP" ?

- Internal monthly technical training session 
- Usually: on *Thursday*, at 3pm  - 3:30pm 
- With  coffee,  tea and  sweets: we relax while training !

Initiative of Quentin and Vincent  in January 2017...

Continued by Rémi, Muhammad, Rami and Lilian  !

Not only @ SCEE ?

- Currently open to the *FAST* and *AUT* teams

Agenda for today

[30 min]

1. Quick presentation of internal tools @ SCEE

[5 min]

2. What are the Jupyter notebook tools ?

[10 min]

3. Demo time

[10 min]

4. Sharing your notebooks online or as PDF

[5 min]

Please 

Ask questions and interrupt me if you want!

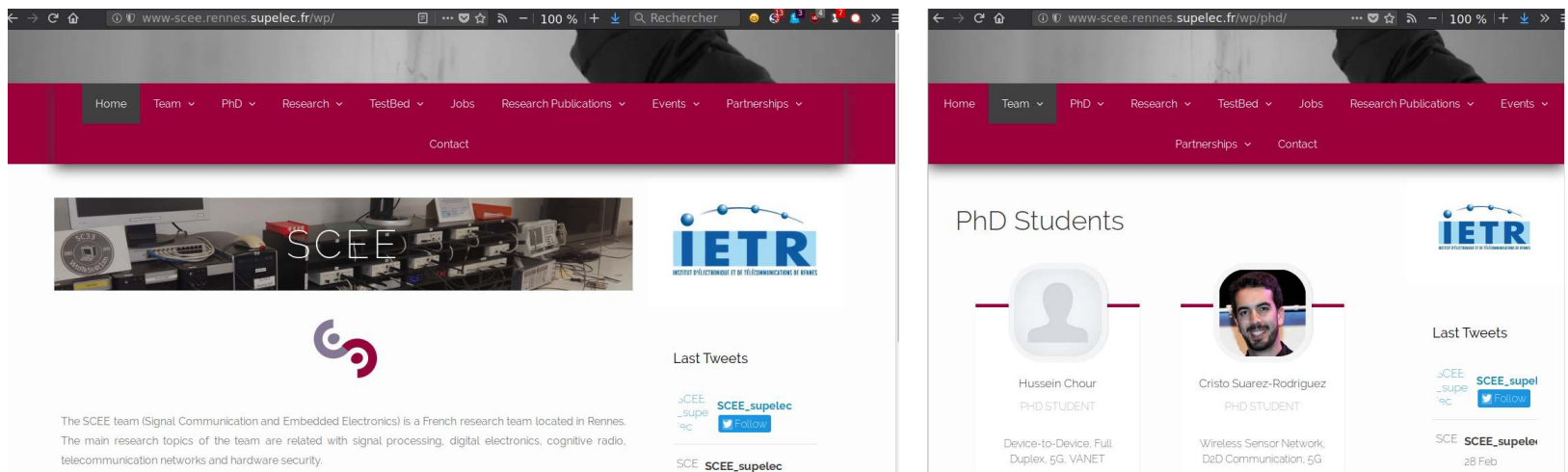
1. Presentation of internal tools @ SCEE

- Welcome to our new PhD student and interns 🙌 !
- You met (almost) everybody this week !
- You will become familiar with the research themes of our team...

↳ Let see a few  tools that can make your life easier!

Website

- www-scee.rennes.supelec.fr was created by Rémi and Aymeric
- It is maintained mainly by Rémi : we need help!

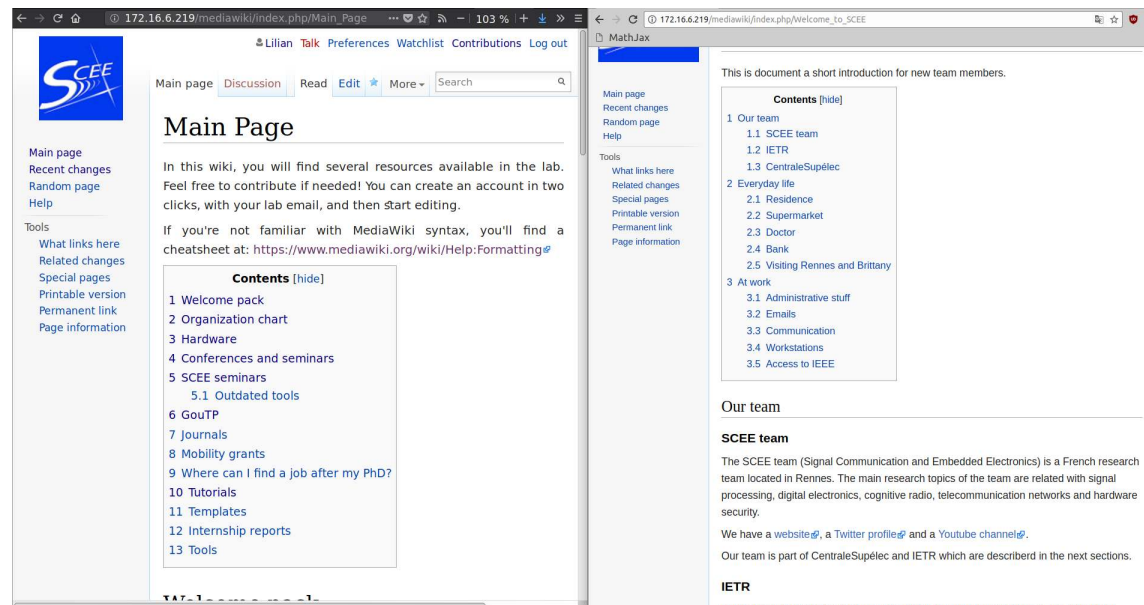


New comers, please


- send a short summary of your research interest with links to your LinkedIn, Google Scholar profile (or other sites). Picture: *if you want*
- to Rémi and I so we add you on the website

Internal Wiki

- We have a MediaWiki running locally on <http://172.16.6.219/>
- Welcome pack : can be useful in your first days here!
http://172.16.6.219/mediawiki/index.php/Welcome_to_SCEE
- Anyone can edit, it is maintained by Rémi and I
- Participate if you have anything to change (create an account, edit!)



Workstations (Windows & GNU/Linux)

- 2 Windows 7 workstations, with MATLAB
 - WS1 : 172.16.6.211
 - WS2 : 172.16.6.212
- 1 GNU/Linux (Ubuntu) workstation, with Python, GNU Radio...
 - WS3 : 172.16.6.213
- Powerful machines: 12 cores, 32 Gb of RAM, lots of storage...
- Monitoring  : <http://172.16.6.219:8000> (ask us for **id/passwd**)
(please check for use load, before launching heavy simulations)



Ask for an account if you need

- To run computations, or to use the TestBed
- Ask to *Muhammad* for Windows, to *me* for GNU/Linux

172.16.6.219:8000

```

===== SCEE Workstations =====
- 172.16.6.211 : T581001 (windows7)      - WS1
- 172.16.6.212 : RFDET5801 (windows7)   - WS2
- 172.16.6.213 : RPDLE501 (LinuxMate)  WS3 & Testbed

+ Browse to http://172.16.6.219:8000/ for a live view
+ Browse to http://172.16.6.213/ for Munin Monitoring
Help ? If needed: @admin on https://SceeTeam.Slack.com/
? or talk directly to: Lilian or Rami

```

172.16.6.213 - Connexion Bureau à distance

Moniteur système

Processus Ressources Systèmes de fichiers

Historique d'utilisation du CPU

CPU1 58,0%	CPU2 55,6%	CPU3 33,7%	CPU4 43,4%
CPU5 32,7%	CPU6 39,0%	CPU7 67,3%	CPU8 58,4%
CPU9 19,8%	CPU10 25,7%	CPU11 22,8%	CPU12 28,3%

Historique d'utilisation de la mémoire physique et du fichier d'échange

Mémoire: 7,9 Gio (25,2%) sur 31,3 Gio

Swap: 0 octet (0,0%) sur 31,9 Gio

Historique du trafic réseau

Réception: 15,1 Kio/s
Total reçu: 8,3 Gio

Envoi: 446,3 Kio/s
Total envoyé: 146,5 Gio

172.16.6.211 - Connexion Bureau à distance

CPU Usage: 59 %

Memory: 14,7 GB

Physical Memory (MB)	System
Total: 32692	Handles: 105588
Cached: 10336	Threads: 2729
Available: 17619	Processes: 169
Free: 7424	Up Time: 111:13:53:03
	Commit (GB): 20 / 79

Kernel Memory (MB)

Paged: 1116
Nonpaged: 535

Processes: 169 CPU Usage: 59% Physical Memon: 46%

172.16.6.212 - Connexion Bureau à distance

UC utilisée: 5 %

Mémoire: 21,1 Go

Mémoire physique (Mo)	Système
Totale: 32692	Handles: 63353
En mémoire cache: 11254	Threads: 2223
Disponible: 11046	Processus: 148
Libre: 0	En activité: 198:08:36:05
	Valider (Go): 22 / 79

Screen Task

Open Source

IP: 172.16.6.219 - Connexion au réseau local Port: 8000 Take Screenshot Every:

URL: http://172.16.6.219:8000 500 Millisecond

USRP TestBeds

- We have 8 USRP cards that can be used from GNU Radio Companion on the WS3
- See more on http://172.16.6.219/mediawiki/index.php/Main_Page#Hardware

Monitoring

- <http://172.16.6.213:8000> (made by Quentin)
- let you see the IP of each USRP card
- and who uses what in real time

Advice

- If you need to use the USRP, *discuss with Rémi and Lilian before*

172.16.6.213:8000 100 % Rechercher

SCEE Testbed Monitor

Kit N°1 192.168.10.101 Disconnected	Kit N°2 192.168.10.102 Disconnected	Kit N°3 192.168.10.103 Free to use	Kit N°4 192.168.10.104 Free to use	Kit N°5 192.168.10.105 Free to use
Kit N°6 192.168.10.106 Free to use	Kit N°7 192.168.10.107 Free to use	Kit N°8 192.168.10.108 Free to use	Kit N°9 192.168.10.109 Disconnected	Kit N°10 192.168.10.110 Free to use
Kit N°11 192.168.10.111 Free to use	Kit N°12 192.168.10.112 Disconnected	Kit N°13 192.168.10.113 Disconnected	Kit N°14 192.168.10.114 Disconnected	Kit N°15 192.168.10.115 Disconnected
Kit N°16 192.168.10.116 Disconnected	Kit N°17 192.168.10.117 Disconnected	Kit N°18 192.168.10.118 Disconnected	Kit N°19 192.168.10.119 Disconnected	Kit N°20 192.168.10.120 Disconnected

2. "Project Jupyter", jupyter.org



Project Jupyter exists to develop open-source software, open-standards, and services for interactive computing across dozens of programming languages.

2. What are Jupyter notebooks?

Technical aspect

1. A file format, `.ipynb` (just JSON with constraints)
2. An editor in your browser (see it during **demo time**)
3. Tools to convert `.ipynb` files to scripts, HTML, slides, PDF etc.

Practical aspect

4. A very good way to interact with your code
5. Create smart document with text, maths, code, output and figures, **all included in one file**
6. Easy and perfect to share online and with colleagues !

How to learn 🎓 ?

Online 🕸

- Try without installing anything ? → At try.jupyter.org

On your laptop 📁

1. Install it 📦
2. Then start:

```
# from your console  
$ jupyter notebook
```

3. Then experiment, practice and learn

If you installed Python with Anaconda, it should be in your system menu *by default* (along *Spyder*, *IPython* and *IPython QT Console*)...

How to install it ?

Install it (you need  Python) from <https://jupyter.org/install.html>.

```
$ conda install jupyter # if you use Anaconda/conda  
$ pip install jupyter # for the system-wide Python & pip
```

How to start it ?

```
$ jupyter notebook # from your console  
...  
Copy/paste this URL into your browser when you connect  
for the first time, to login with a token:  
http://localhost:8888/?token=44450caacdbe3ecddc21e02e66a6b5162c
```

- It should open <http://localhost:8888/notebooks/> in your browser
- Or open the link in your terminal

Only for Python 🙄 ??

- No: supports naitively Julia, Python and R (**Ju + Py + R = Jupyter**)
- Dozens of "kernels" allow you to use Jupyter with *almost* any language ! (for free). Installation is usually simple & fast.

Partial list

- Interpreted languages: 🐉 Bash, 🐪 Caml/OCaml, Lua etc
- 😊 and of course Wolfram Mathematica and MATLAB
| even if they have their own notebook tools now.
- 🙄 But also compiled languages : C++, C, Go, Java !

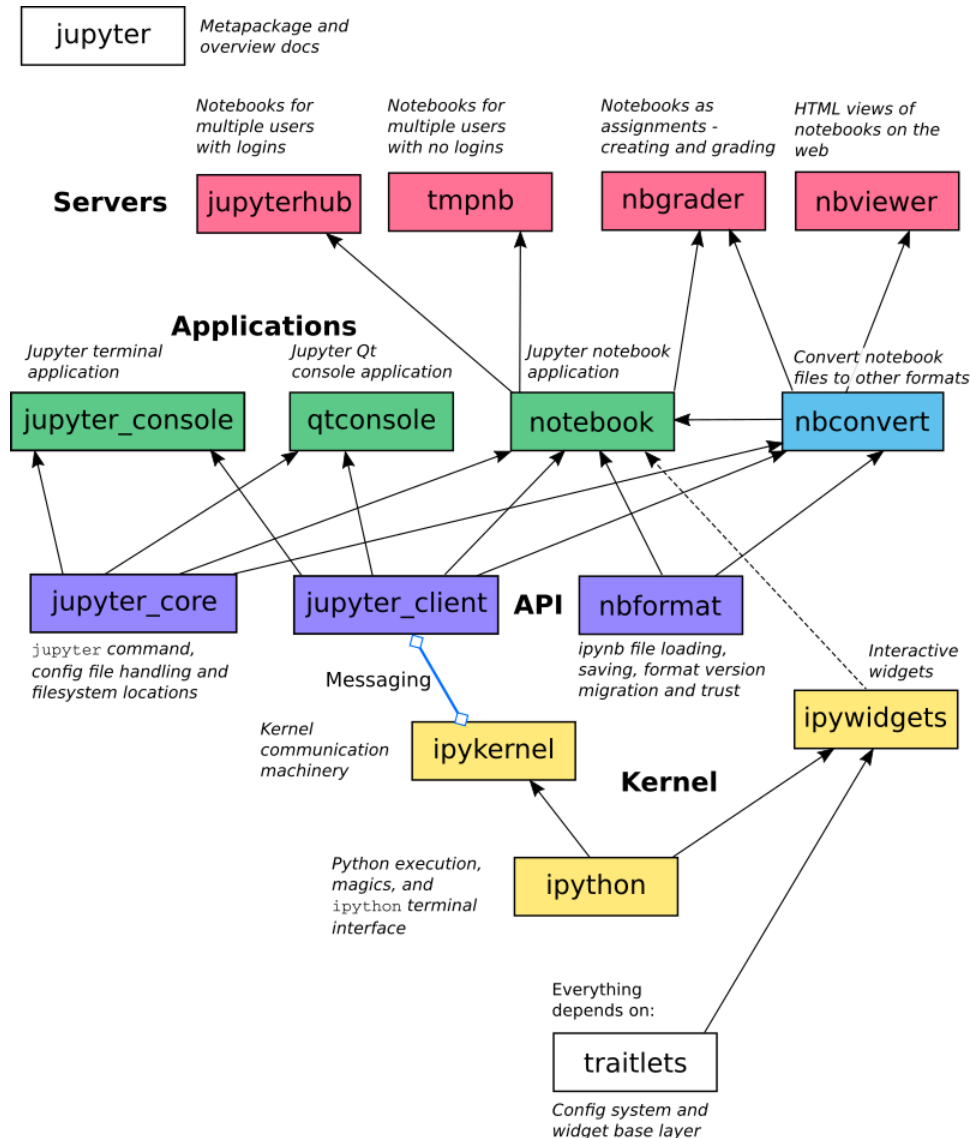
Complete list of "kernels"

| See github.com/jupyter/jupyter/wiki/Jupyter-kernels

3. Demo time

- I will show you quickly all this...
- With an example of coding in Python.
- Reference documentation is:
jupyter.readthedocs.io/en/latest/content-quickstart.html

Internally, it's quite complicated, just don't care



Conclusion (1/3)

Sum-up

- I hope you got a good introduction to Jupyter 🙌
 - Official documentation: at jupyter.rtdf.io
- Also datacamp.com/community/tutorials/tutorial-jupyter-notebook

Pointers

1. ❤️ use it and fall in love with it !
2. Use Jupyter-themes (github.com/dunovank/jupyter-themes)
to customize the UI as you wish (dark themes, custom fonts etc)
3. Use extensions if you want more features,
See jupyter-contrib-nbextensions.rtdf.io

Conclusion (2/3)

Next GouTP @ SCEE

- Any request or suggestion ?

GouTP @ FAST or AUT ?

| By Pierre Haessig ?

- **Julia programming language** (~ between Python and Matlab)
↳ see julialang.org if you are curious

We need participants!


| 🙋 By *you*? Any idea is welcome! 😊

Conclusion (3/3)

Thanks for joining 🙌 !

Contact us if you want to do a GouTP !

Your mission, if you accept it... ✨

1. *Padawan level* : next time you program in  Python (or other language), think about **Jupyter**. Can it help you being more efficient?
2. *Jedi level* : Try to use **Jupyter** when you will have to share or show some piece of code?
3. *Master level* : From now on, try to use (only?) open-source tools for your research (Python and others)...