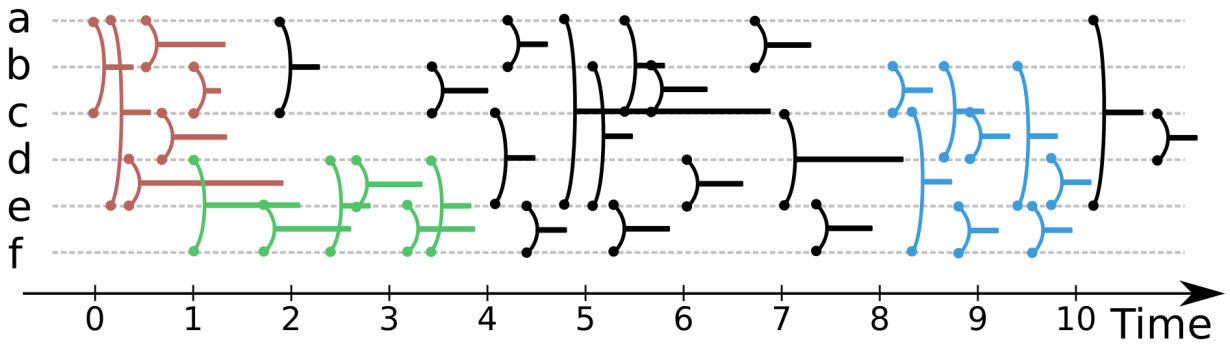
Research Engineer at Laboratoire d'Informatique de Paris 6

Computational tools for observing and analysing opinion dynamics in the media



Institutions: Sorbonne Université / CNRS
Laboratoire d'informatique de Paris 6 (UMR 7606)
Équipe Complex Networks `www.complexnetworks.fr`

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Contract: One-year CDD (January 2020 – December 2020)

Salary: From 2443€ to 3019€ gross per month (based on experience)

Address: LIP6, 4 place Jussieu, 75005 Paris

This position is founded by the H2020 European project ODYCCEUS "Opinion Dynamics and Cultural Conflicts in the European Space". `www.odycceus.eu`

To candidate, please send a complete résumé and letter to:
`Robin.Lamarche-Perrin@lip6.fr`

Research Context: The ODYCCEUS Project

Social media and the digitisation of news are having far-reaching effects on the way individuals and communities communicate, organise, and express themselves. Can the information circulating on these platforms be tapped to better understand and analyse the enormous problems facing our contemporary society? Could this help us to better monitor the growing number of social crises due to cultural differences and diverging world-views? Studying the structure of debates in the public sphere requires sophisticated methods for the analysis of information flows between individuals. How information is shaped and broadcasted by mass media? How to describe the way opinions are discussed in social media? Debates are often represented as complex entanglements of such social interactions, embedded in space and time, and displaying a multilevel structure: From individual to institutional discourses; From the fast dynamics of "buzzes" to the slower dynamics of social controversies.

To address these challenging issues, the H2020 ODYCCEUS project (`www.odycceus.eu`) gathers researchers in computer science, applied mathematics, and social sciences (communication and political sciences, geography, economy) from six different European countries. One of the main objective of this international and interdisciplinary consortium is to conceive and develop new computational tools (scripts, software libraries, Web interfaces) for the analysis of social conflicts and opinion dynamics. These tools will be integrated to the PENELOPE platform (`https://penelope.vub.be/`), an open and distributed collection of compliant Web services for quantitative researchers, data journalists, and world citizens.

The Team: Observing and Analysing Complex Networks

Within this research context, the "Complex Networks" team (`www.complexnetworks.fr`) at LIP6 is responsible for the development of tools dedicated to network analysis. For that purpose, we developed during the last years numerous formalisms, algorithms and measures in graph theory. Today, we aim at unifying and integrating this theoretical work within consistent pieces of software to make it accessible to researchers in social sciences.

In particular, the `stream_graph` library – developed by Yiannis Siglidis – offers data structures and computational methods for the analysis of dynamical networks by focusing on the spatio-temporal description of social interactions: *Who interacts with whom, and when?*

Sources: `https://github.com/ysig/stream_graph`

Documentation: `https://ysig.github.io/stream_graph/doc/`

The `data.cube` library is another example of such software objective, dedicated to the exploration of statistical outliers in multidimensional data.

Sources: `https://github.com/Lamarche-Perrin/data.cube`

Tutorial: `https://lamarche-perrin.github.io/data.cube/tutorial/`

Current Position: Developing Software and Web Services for Social Scientists

This research engineer position aims at pursuing this team effort by enhancing previously developed software and developing Web services on top of it in order to make them available to a broader audience. In particular, the ODYCCEUS project aims at conceiving "observatories" for social scientists and data journalists, that is interactive online services for the visualisation, exploration and analysis of social networks.

Depending on the personal interest of interviewed candidates, the position could hence focus on one (or several) of the following levels of development:

- Improvement of back-end software to support large-scale network analysis, in particular by continuing the development of the `stream_graph` or the `data.cube` libraries;
- Conception of Web services based on these existing libraries to make them accessible to social scientists and to integrated them within the PENELOPE platform;
- Conception of "network observatories" by integrating such services into interactive Web pages to help data journalists and citizen to better grasp opinion dynamics;
- Exploitation of these developed tools for empirical research in collaboration with social scientists of the project by focusing on particular research questions in sociology.

Diplomas and Skills

This position does not require any preliminary knowledge of the tools and theoretical frameworks that have been developed by the "Complex Networks" team. It however requires a strong interest in the development of end-user tools (in Python or in R) for researchers in social sciences.

In addition, the candidate should have:

- A PhD doctorate in computer science or an engineering degree;
- An excellent knowledge of Python or R for software development;
- Good writing skills in English for documentation and tutorials;
- Some knowledge of Git for project management.

Bibliography

To better grasp the work that is conducted in the "Complex Networks" team, see the list of articles that have been published on its website:

`http://www.complexnetworks.fr/papers/`