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The poster features a dark blue background with a green and white circular graphic on the left containing the text 'ECS UNITED' and a stylized 'E' with three vertical bars. The ECS logo is in the top right, followed by the text 'The Electrochemical Society' and 'Advancing solid state & electrochemical science & technology'. The main text on the right reads '247th ECS Meeting', 'Montréal, Canada', 'May 18-22, 2025', and 'Palais des Congrès de Montréal'. A green circle in the bottom right corner contains the text 'Abstracts due December 6th'. At the bottom left, it says 'Showcase your science!'.

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**247th ECS Meeting**  
Montréal, Canada  
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*Palais des Congrès de Montréal*

**Abstracts due  
December  
6th**

**Showcase your science!**

# PLUME–FEATHER, Referencing and Finding Software for Research and Education

O Bénassy<sup>1</sup>, C Caron<sup>2</sup>, C Ferret-Canape<sup>3</sup>, A Cheylus<sup>4</sup>, E Courcelle<sup>5</sup>,  
C Dantec<sup>6</sup>, P Dayre<sup>7</sup>, T Dostes<sup>8</sup>, A Durand<sup>9</sup>, A Facq<sup>10</sup>, G Gambini<sup>11</sup>,  
E Geahchan<sup>12</sup>, C Helft<sup>13</sup>, D Hoffmann<sup>14</sup>, M Ingarao<sup>15</sup>, P Joly<sup>16</sup>, J Kieffer<sup>17</sup>,  
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O Porte<sup>11</sup>, G Romier<sup>22</sup>, D Rousse<sup>11</sup>, R Tournoy<sup>23</sup>, H Valeins<sup>24</sup>

<sup>1</sup>UFR Droit, Université Paris-Sud 11, Orsay, France <sup>2</sup>Station Biologique Roscoff, CNRS, France  
<sup>3</sup>INRIA, Lille, France <sup>4</sup>L2C2, UMR 5304, ISC, CNRS, UCBL, Lyon, Bron, France <sup>5</sup>LIPM, INRA,  
CNRS, Toulouse, France <sup>6</sup>CRBM, Universités 1 et 2, CNRS, Montpellier, France <sup>7</sup>IRIT, INPT,  
CNRS, Toulouse, France <sup>8</sup>IMM, Aix-Marseille Université, CNRS, Marseille, France <sup>9</sup>CLEO,  
Aix-Marseille Université, CNRS, EHESS, Marseille, France <sup>10</sup>CRPP, Université Bordeaux 1, France  
<sup>11</sup>DSI, CNRS, Meudon and Labège, France <sup>12</sup>CNAM Ile de France, Paris, France <sup>13</sup>Laboratoire de  
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Université, CNRS/IN2P3, Marseille, France <sup>15</sup>Institut d'Histoire de la Pensée Classique, CNRS, ENS  
de Lyon, France <sup>16</sup>LJLL, CNRS, Université Pierre et Marie Curie, Paris, France <sup>17</sup>ESRF, Grenoble,  
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CNRS, Marseille, France <sup>20</sup>Université Lyon, Environnement Ville Société, CNRS, ENS Lyon,  
F-69342, France <sup>21</sup>UMR METAFORT, Select, VetAgro Sup, Lempdes, France <sup>22</sup>Institut des Grilles et  
du Cloud, CNRS, Lyon, France <sup>23</sup>CCSd, CNRS, DIST, France <sup>24</sup>RMSB, CNRS, Bordeaux, France

E-mail: [Plume@Services.CNRS.Fr](mailto:Plume@Services.CNRS.Fr)

## Abstract.

PLUME-FEATHER is a non-profit project created to **P**romote **e**conomical, **U**seful and **M**aintained software **F**or the **H**igher **E**ducation **A**nd **T**HE **R**esearch communities. The site references software, mainly Free/Libre Open Source Software (FLOSS) from French universities and national research organisations, (CNRS, INRA...), laboratories or departments as well as other FLOSS software used and evaluated by users within these institutions.

Each software is represented by a reference card, which describes origin, aim, installation, cost (if applicable) and user experience from the point of view of an academic user for academic users. Presently over 1000 programs are referenced on PLUME by more than 900 contributors. Although the server is maintained by a French institution, it is open to international contributions in the academic domain. All contained and validated contents are visible to anonymous public, whereas (presently more than 2000) registered users can contribute, starting with comments on single software reference cards up to help with the organisation and presentation of the referenced software products.

The project has been presented to the HEP community in 2012 for the first time [1]. This is an update of the status and a call for (further) contributions.

## 1. Introduction

PLUME (“feather” in english) — and its international version FEATHER — has been initiated in 2006 and is run since 2011 by the central CNRS computing division DSI. The PLUME project thus receives fundamental support from the top management levels of one of the big research



institutions in Europe (the biggest in France). It intends to be a platform about software “from academic people for academic people”. The main goals of PLUME-FEATHER are:

- promotion of the communities’ own developments,
- contribution to the development and sharing FLOSS (Free/Libre Open Source Software) information, experiences and expertise in the community,
- opportunities for FLOSS experts and knowledgeable people in research and education to build a community,
- to foster and facilitate FLOSS use, deployment and contribution in research and education communities.

The necessary resources are provided by the main partners involved in the project, including lab members of the CNRS (better known in [C]HEP for its IN2P3 division), Inserm, CEA, RESINFO, RENATER and so on. The French PLUME website contains more than 1000 software reference cards, edited and peer- reviewed by members of the research and education community. It is online since November 2007, and the first English pages have been published in April 2009. Currently there are 114 software products referenced in the PLUME-FEATHER area. The project has been presented in the last CHEP conference to announce its availability and potential on international level to find not only users, but also contributors — editors and reviewers — of frequently used software in our domain. The following is an update of the situation, focussing on some domains close to the CHEP thematics: physics (of high energies), GRID computing and software development.

## 2. PLUME at the time of CHEP 2013

Last year PLUME has exceeded 2,000 members from France and elsewhere. From an idealistic project of volunteers it has molted into an official service, which is supported by many research labs in the French-speaking community and in particular CNRS. We would like the HEP community to use PLUME-FEATHER, the English portal of PLUME and, in the best case, join us. Looking for your favourite tools — GEANT and ROOT [2] —, you will not be disappointed, but you are probably aware of many more useful software tools and applications that could make their way into the PLUME register, thus sharing your knowledge with the community immediately.

### 2.1. Physics

The relatively recent theme of “physics” in PLUME is still a vast container of software for optics, hydrodynamics, acoustics, electronics, astronomy and astroparticle physics and, last but not least, particle physics, which are represented for example by the probably most widely used library-framework application ROOT [2] developed at CERN, or the GNU-licensed IDL alternative GDL [3]. On the other hand we have instrumentation software like data acquisition, control and command applications as well as real time programming to the extent of modeling tools for this highly specialized kind of software engineering. The “mechanics” theme has been separated from the physics mainstream, without having found yet its own co-ordinator, thus going the natural way of splitting more specific themes from a more general portfolio, as the number of referenced software grows. However there is more “physics” software that deserves being known and brought to the knowledge of the community. The co-ordinator of the “physics” theme is co-author of this paper (DH) and welcomes any contact via e-mail concerning PLUME.

### 2.2. Distributed computing, GRID and Cloud

France Grilles [4], the National GRID Initiative and French partner of the European GRID Infrastructure EGI [5], is in charge of this theme, created about three years ago. It gathers

various types of tools used in distributed computing on infrastructures providing users with a high level of quality. Site administrators may find tools to manage, deploy, monitor servers, clusters, sets of computers or clouds such as NAGIOS, Quattor or XtremWeb-HEP [6] for example. Users may manage their production or their data with DIRAC [7] or iRODS [8] or OpenMole. France Grilles people expertise in cloud software development, deployment and management is shared with the StratusLab [9] reference card or OpenStack. The collaboration between France Grilles and PLUME is a win-win game. PLUME receives from France Grilles teams skills, knowledge and relationships at national and international level. On the other hand France Grilles uses PLUME as the best tool to present its catalog of software to its french speaking users and to disseminate the developments of its working area worldwide in French and in English. PLUME is also a very fruitful source of contacts in all disciplines and a good way to collaborate with potential users, thanks to the PLUME team.

### *2.3. Software Development*

The Developer theme contains different kinds of software, API, tools used to help software developers and improve software quality. The main practices in software engineering are described through cards: software versioning, IDE (Integrated Development Environment) such as Code::Blocks [10], build automation such as Cmake [11], software testing, and continuous integration such as Jenkins [12]. A lot of API and useful libraries presented in this theme are developed by research and education communities under the main free software licenses. Often these software cards are also published as devESR card. Beyond software reference cards, several articles on “best practices” for software development projects and tutorials are available.

## **3. Submittal and Reviewing Process**

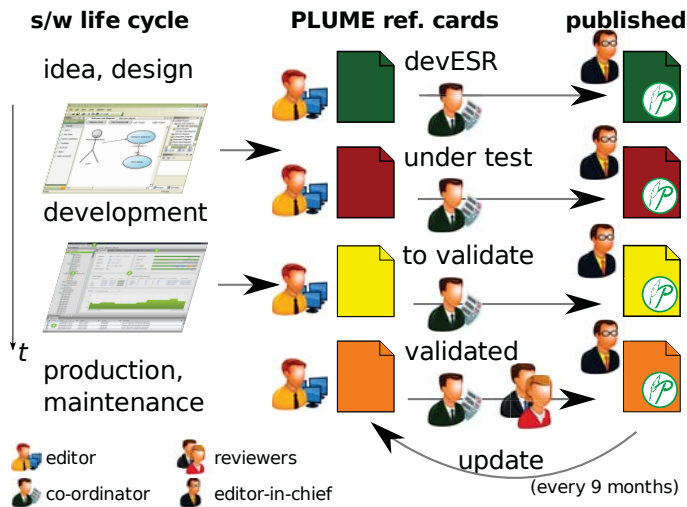
PLUME defines five types of users for the purpose of its project:

- anonymous visitors — They can see most of the published information contained in the website.
- registered members — They can start to contribute with comments on software reference cards and contact other members via the PLUME e-mail interface. They can suggest (or request) reference cards that do not yet exist for a given software. PLUME members are mainly members of the research and education community.
- contributors — These members have contributed at least once to the site by either writing a reference card or peer-reviewing someone else’s reference card.
- co-ordinators and editors-in-chief — In a way rather similar to classical journals, this team of about three dozens experienced contributors from very various academic domains gathers new proposals and organises reference card editors and peers for reviews, keeping an overall coherent and consistent scheme of the site among all different aspects.

In terms of production, information about any (academically used or produced) software can be published at various stages of its existence, as is depicted in Fig. 1. The software should however fulfill the criteria of “UME” (useful, maintained, economical) and wherever possible be distributed as FLOSS.

- At the very beginning, developers may just want to reference a piece of software that has been written in their lab, be it by themselves or other colleagues. This kind of publication (devESR, development for education and scientific research) allows to keep an up to date register of in-house developed products on one hand. On the other hand, there is a high probability that software has been developed or is going to be developed for similar or identical purposes in other labs. Collaborations on software development can be born or initiated like this.





**Figure 1.** PLUME can accompany software development regarding the aspects of valorisation, quality control and information exchange during the life cycle of in-house developed or external programs and libraries: Depending on the state of the software and on its usage in research and education the publication process is very light weight (like for the simple announcement in a devESR card) or follows a complete procedure of regular peer reviews (for validated software used on at least three different sites).

- Users may install in-house or external software for test purposes. A publication of this fact in a **to-be-tested** card can help find other users in a similar situation, to exchange experience or help out with problems, that may be specific to the academic environment.
- The next step in the life cycle of software in a research lab or university is typically the state of wide usage inside a lab. Its users can give a judgement that is objective albeit focussed on academic usage. These **to-be-validate** cards are of great help to people who want to choose among several available but otherwise unknown products.
- Finally, the last stage of a **validated software** is defined to be used on more than three different sites, hence by more than two users in production or at production level. These cards are peer-reviewed, thus granting a high level of the contained information. They are updated at least once per year.

Other special purpose documents about computing resources or relevant news (“briefs”) complete the portfolio of services provided by PLUME. Any of the reference cards can be commented by registered members.

Quality is a buzz-word nowadays, and PLUME also serves this modern approach: Quality includes the announcement of existing and delivered services and products. PLUME is an very convenient tool for this.

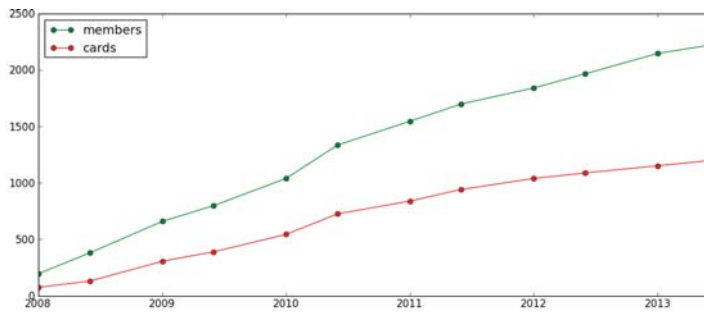
#### 4. Indicators and Future Plans

The PLUME project is steadily evolving, the number of participating members and the production of reference cards still increase significantly over time with a slight indication of saturation. We are searching and accepting collaborators from new domains and beyond the limits of French-speaking countries.

##### 4.1. Statistics

As of October 2013, contains 1264 reference cards (pages) for: 405 validated programs, 50 programs to be validated, 14 under test, 292 resource cards, 357 devESR cards, of which 114 are written in english. 32 cards have been archived due to their editors failing to perform the update procedure for a too long time. The PLUME community counts 2261 members, of which 948 are contributors. And our website counts approximately 200,000 hits per month.

The historical evolution of the total numbers of reference cards and PLUME members is shown in Fig. 2. A steady increase is still visible, although the expected saturation seems to appear since approximately one year.



**Figure 2.** Diagram showing the evolution of the numbers of pages (cards) in PLUME and registered members of the research and education community.

**Table 1.** Principal PLUME themes and number of software reference cards assigned (software ref. cards + in-house developments devESR, double counting for several themes possible) as of October 2013

Theme		Theme	
System and network administration	152+30	Mathematics	56+146
Biology	64+79	Mechanics	18+60
Chemistry	25+20	Modelisation	45+83
Collaborative work	62+24	Physics	26+23
Developers	129+65	Social sciences	29+37
Documentation	46+14	Security	36+3
Training/teaching	34+15	Lab IT systems	28+15
Distrib. computing, GRID, cloud	101+157	<i>total</i>	469+357

#### 4.2. Call for Participation

We hope to receive many visits from HEP users, be it for using existing information or contributing new topics. Although our international side does not develop as quickly as we would have wished, we are interested in collaborators and co-workers outside France. Similar movements and interests to "beg, borrow and steal" software seem to exist already [13]. We are convinced that software-reuse will profit to the community by a coordinated common effort and attempt to make the PLUME-FEATHER project better known to users outside France as well.

The PLUME website is <http://projet-plume.org>.

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- [3] <https://www.projet-plume.org/fiche/gdl>
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