

# Free/Libre Open Source Software in Medical Informatics Research and Education

Thomas KAROPKA<sup>a,1</sup>, John MANTAS<sup>b</sup>, Arie HASMAN<sup>c</sup>, Ricardo CRUZ-CORREIA<sup>d</sup>,  
Christian LOVIS<sup>e</sup>, Holger SCHMUHL<sup>f</sup> and Björn BERGH<sup>f</sup>  
<sup>a</sup>*BioCon Valley GmbH, Germany*  
<sup>b</sup>*University of Athens, Greece*  
<sup>c</sup>*Academic Medical Center, Amsterdam, The Netherlands*  
<sup>d</sup>*CINTESIS, Universidade Porto, Portugal*  
<sup>e</sup>*University Hospitals of Geneva, Switzerland*  
<sup>f</sup>*Dept. of Information Technology and Medical Engineering, Heidelberg University  
Hospital, Germany*

**Abstract.** Free/Libre Open Source software (FLOSS) has gained much attraction in the past couple of years and has produced a large number of excellent tools and software packages. Although the use of FLOSS in medical informatics is still quite low, there are a number of benefits that make FLOSS an excellent choice. For research and education the use of FLOSS in medical informatics is of particular interest. In the academic world the use of FLOSS is already very common as the FLOSS principles are best suited for collaborative software development within the research community. But how to transfer a successful developed application or algorithm to the real world? The real world provides challenges and barriers that often bring research projects to an end instead of a sustainable distribution of the developed application. Another topic is the use of FLOSS in medical informatics education. FLOSS gives students the opportunity to learn the inner workings of real world tools through a hands-on experience. This workshop provides first hand experience from researchers that actively use FLOSS in medical informatics education or have expertise in setting up FLOSS projects to transfer knowledge from science to the health care community.

**Keywords.** Open source software, education, medical informatics

## Introduction

Education and capacity building is of utmost importance for the creation of a knowledge-based society as well as for tackling the challenges of our modern world. Cost efficiency and effectiveness are also core requirements in times of financial crisis and scarce resources. The application of Free/Libre Open Source Software (FLOSS) is very well suited to provide highly professional tools for a fraction of the usual cost [1]. Although the adoption and the usage of FLOSS tools in health care is still quite low, there are a considerable number of applications available under an open source license

---

<sup>1</sup> Corresponding Author. Thomas Karopka, Dipl.-Ing.; BioCon Valley GmbH, Walther-Rathenau-Str. 49a, 17489 Greifswald, Germany; Email: [tkaropka@googlemail.com](mailto:tkaropka@googlemail.com); Phone: +4917663089371

[2, 3]. Furthermore FLOSS is very well suited to provide students with a cost effective, efficient real world learning environment that is both highly professional and practical. Due to the access to the source code students are able to learn and train their programming skills on real world applications that are applied in the field but are also available for experimentation and learning. The research community has already adopted FLOSS principles to a great extent. Much scientific work is based on open source libraries and tools that are shared in the research community. But often the problem is how to transfer a successfully developed application from research into the market by using FLOSS principles. How to create a community around a software package to maximize the chances of sustainability? Which license should be chosen? These and other questions will be tackled in this workshop.

### **1. Aim of the workshop**

The workshop will provide hands-on experience from researchers and academics using FLOSS in medical informatics education as well as in their scientific work. Special attention will be given to the question of how to transfer research results from academia into sustainable projects or products in the market. Another focus will be on the use of FLOSS in teaching medical informatics concepts.

The second part of the workshop will be organized as a round table. This part of the workshop will start with a panel discussion of invited panelists and will then be held as an ‘unconference’ where participants are invited to propose themes for discussion in the context of the workshop topic.

### **2. Using FLOSS in medical informatics research and education: Presentations from members of EFMI LIFOSS WG and EFMI WG EDU (45 min.)**

Thomas Karopka:	Introduction to the workshop (10 min.)
Ricardo Cruz-Correia:	Using Mirth to teach HL7 (10 min.)
Christian Lovis:	Using FLOSS in building an advanced clinical information system (10 min.)
Holger Schmuhl:	Successfully applying FLOSS principles in medical informatics research projects (10 min.)

### **3. Round Table discussion (45 min.)**

Members of the panel: John Mantas, Arie Hasman, Björn Bergh, Ricardo Correia, Christian Lovis, Holger Schmuhl,

Moderator of the panel: Thomas Karopka

The round table will start with a discussion by invited panelists to set the scope for the round table discussion. Participants are then asked to give input for further discussion. A maximum number of 5 topics will be allowed for discussion. The participants are asked to vote for the topic. Topics will be addressed according to their score.

#### **4. Expected outcome**

The major aims of the workshop are the following:

1. Awareness raising among the medical informatics community about FLOSS principles
2. Provide information for scholars interested in using FLOSS in medical informatics education
3. Provide information for researchers interested in using FLOSS to transfer their research results to the market or to harness FLOSS to create sustainability around their project.
4. Provide a platform for networking and further collaboration

It is expected that researchers will gain advanced knowledge of FLOSS principles, real world experiences and references for further deepening their knowledge to successfully apply FLOSS principles in their own work. The workshop is also intended as a platform to disseminate the results that have been created in the working groups as well as attracting new members for the working groups. Especially the open panel discussion is organized in a way to get feedback about the demands and experiences of the research community and thus get valuable input for the future work of the WGs. This first joint workshop of EFMI LIFOSS WG and EFMI WG EDU is expected to provide a platform to create relationships among the WG members and to open routes for further collaboration.

*Short description of people involved:*

Björn Bergh, Professor of Medical Informatics and CIO of Heidelberg University Hospital.

Ricardo Cruz-Correia, Professor of Medical Informatics at Medical Faculty, University of Porto, member of EFMI LIFOSS WG.

Arie Hasman, Emeritus Professor of Medical Informatics, Academic Medical Center University of Amsterdam, Co-Chair of EFMI EDU WG

Thomas Karopka, BioCon Valley GmbH, chair of EFMI LIFOSS WG and Chair of IMIA OS WG.

Christian Lovis, Professor of Medical Informatics, University Hospitals of Geneva.

John Mantas, Professor of Medical Informatics, University of Athens, Chair of EFMI EDU WG, President of EFMI.

Holger Schmuhl, Research Assistant at Heidelberg University Hospital, Founder of Medfloss.org, Member of the IMIA OS WG, EFMI LIFOSS WG, and Free Software Foundation.

#### **References**

- [1] Webster P, The rise of open-source electronic health records. *The Lancet*, 2011 May; 377(9778): 1641-1642.
- [2] Karopka T, Schmuhl H, Marcelo A, Dal Molin J, Wright G. Towards Open Collaborative Health Informatics – The Role of Free/Libre Open Source Principles. *IMIA Yearbook 2011*. Stuttgart: Schattauer; 63-72.
- [3] MedFLOSS.org: <http://www.medfloss.org>