

## Highlights

- Meet our new Fellows
- New Partners join OMA
- Upcoming OMA Events

## And off we go...

**I am delighted to say that we have filled all our OMA Fellowships well before the end of the first year in the project.**

Amongst hundreds of applications, we have recruited the very best researchers for our projects and they all have now started in their research projects. Against the trend that can often be seen in physics and engineering we have achieved a very good balance amongst Fellows with 7 female and 8 male Fellows from all parts of the world now in post. Following up directly on what we started in our first OMA newsletter, this issue will present several of them to you. I really can't wait meeting all of them for the first time during our researcher skills school in Liverpool!

**The European Union recently celebrated 20 years of its Research Fellowship Programme.**

Since 1996 already, the Marie Skłodowska-Curie Actions (MSCA) have provided grants to train excellent researchers at all stages of their careers. The programme is named after the double Nobel Prize winner Marie Skłodowska-Curie to honour and spread the

values she stood for. To date, around 100,000 researchers have benefited from the programme – among them five Nobel laureates and one Academy Award winner.

One of the flagship schemes of this programme are European Training Networks, such as OMA. They provide a unique training environment and have shown to be highly efficient for building bridges between research communities, sectors, as well as for filling skills gaps internationally.

Accelerator research seems particularly well suited for the ambitions of this programme as it almost naturally joins sectors, countries and researchers at different experience levels. For sure all of this is already happening in OMA.

Enjoy this newsletter.

Prof. Carsten P. Welsch  
OMA Coordinator

## Network News

### Meet our new Fellows

All fifteen OMA Fellows have now been recruited to the OMA project. We presented some of them in the last issue, below is the next group.

**WELCOME TO OMA!**

#### Carlos Afonso

Carlos Afonso graduated from University of Minho with a Bachelor's in Informatics Engineering in 2014. In the same year he started his Master's in Informatics Engineering at University of Minho, specializing in Applications Engineering, Distributed Systems, and Cryptography. During his Master's, he did an internship with the Iberian-International Nanotechnology Laboratory, working with data analysis of electron microscopy data. Carlos graduated with a Master's degree in 2016, his Master's

project was the creation of an elasticity controller for applications orchestrated with Cloudify.

In October 2016 Carlos joined the OMA network to work at CNAO.

*Project:*

[Light ion therapy software for data exchange](#)



#### Giulia Aricò

Giulia Aricò carried out her Master's degree in Medical and Biological Physics at the University of Trento (Italy) from 2010 to 2012. She developed her Master thesis at the Paul Scherrer Institute (Switzerland), in the field of proton therapy.

response of the Timepix detectors to ions heavier than carbon, like neon and argon.

In the years 2013-2016 she performed doctoral research at the Heidelberg University Hospital, in collaboration with the DKFZ (Germany). She investigated the fragmentation of carbon and helium ion beams in different materials, to improve the physical beam model used in radiotherapy. Fixed target experiments were performed at the HIT facility, and the Timepix detectors, developed at CERN, were used for particle identification and tracking. During her PhD she also performed measurements at the HIMAC facility (Japan) to investigate the

In 2016 Giulia joined the OMA project at CERN to work on the improvement of the FLUKA code for medical applications. Her expertise includes proton and ion therapy, particle beam accelerators, solid state detectors and Monte Carlo simulations. Recently Giulia has obtained her PhD degree from the Heidelberg University.

*Project:*

[Improvements on FLUKA for medical applications](#)



### Anna Baratto Roldán

Anna Baratto Roldán studied Physics at the University of Trieste in Italy. Following the completion of her Bachelor's degree in 2013, she enrolled in the MSc course of Nuclear and Subnuclear physics at the University of Trieste, choosing medical Medical Physics as her main subject. During her studies she developed a keen interest in the fields of charged particle therapy and radiobiology.

Anna carried out her Master's thesis within a cooperation program between the University of Trieste and the INFN Section of Milan, and obtained her Master's degree in March 2016. For her thesis project, she worked on the measurement and analysis of charged secondary particles emitted by oxygen beams impinging on a PMMA target. The project was part of a larger experiment, held at the Heidelberg Ion Beam Therapy centre, which

aimed to develop new real-time monitoring techniques for Charged Particle Therapy.

In November 2016, Anna joined the OMA project at University of Seville and CNA, where she will work on realization of a system for irradiation of cell samples at the cyclotron installed at CNA. In order to do so, she will perform dosimetry studies outside and in the region of the Bragg peak, as well as develop Monte Carlo tools for the calculation of proton relative biological effectiveness (RBE).

*Project:*

[Radiobiological effectiveness of protons](#)



### Samuele Cotta

Samuele Cotta received his Bachelor's degree in Physics in 2013 from the University of Insubria in Como (Italy), with a thesis about the characterization of a PbWO<sub>4</sub> calorimeter read out by SiPM.

In the same year he started his master's studies at the University of Insubria, focusing on medical physics.

Samuele obtained his Master's degree in Physics in March 2016 with a thesis about the characterization of an active detector for neutron flux measurements. During his thesis work he assembled and tested a detector based on a CsI crystal, which was then used to measure the neutron contamination flux in a radiotherapy treatment room. The results

were also obtained through Monte Carlo simulations with Geant4.

In January 2017 he joined the OMA project at ViALUX in Chemnitz. The project will focus on the enhancement of the long-term reliability of new 3D/4D scanning sensors for use in radiotherapy environment.

*Project:*

[Optimization of high-performance 3D/4D surface scanning technology for patient monitoring in radiotherapy environment](#)



## Andrea De Franco

Andrea De Franco graduated from the University of Genova with a Master in Physics of Fundamental Interactions in 2012. His thesis concerned the design and development of a novel neutron detector based on diamond with the main purpose of measuring neutron flux and spectrum in accelerator driven fast nuclear reactor prototypes. He spent one year in Japan in the framework of the Vulcanus in Japan project, at the beginning of which he studied Japanese for 4 months. Later he did an internship of 8 months in the nuclear power plant system engineering department of Hitachi, where he performed safety system analysis for possible facility upgrade. From October 2013 to September 2016 Andrea performed research at the sub-department of

astrophysics of the University of Oxford for the Cherenkov Telescope Array project. His focus was on the development of a camera for ground based multi-Teraelectronvolt gamma-ray astrophysics.

In November 2016 Andrea joined the OMA project as a fellow at the EBG MedAustron in Wiener Neustadt (Austria), where he will perform studies on facility optimization for patient throughput enhancement.

*Project:*

[Treatment facility optimization studies](#)



## Anna Vnuchenko

Anna Vnuchenko graduated from the University of Paris-Saclay, France in 2016 with a Master's degree in physics. She completed a multidisciplinary program with a specialisation in large facilities. For her studies Anna was awarded a scholarship from French Government and Paris-Sud University. Anna also holds a degree with honours from the department of physics and mathematics of the National Teachers' Training University in Ukraine.

She has work experience from the department of nuclear and physical research in IAP-NASU, where she took an active part in design, installation and commissioning of an automated goniometer on nuclear recoil end-station of the accelerator-based facility to study the radiation damage produced due to

the ions implantation. Apart from accelerator physics other areas of research were the fundamental investigations of interaction processes of MeV ions with matter by means of HRBS and HERDA techniques.

Anna joined the OMA network to work on Application of high gradient RF technology for hadron therapy accelerators, a project hosted by CSIC/IFIC.

*Project:*

[Application of high gradient RF technology for hadron therapy accelerators](#)



## New Partners join OMA

The OMA network is delighted to welcome three new adjunct partners in the consortium.

### OncoRay

OncoRay in Dresden, Germany, is a center for radiation research in oncology, with research focusing on the fields of medicine, physics, biology and information sciences. Its objective is to achieve a decisive improvement in the treatment of cancer using biologically individualized, technologically optimized radiotherapy. Key research projects include further

development of image-guided proton therapy and the development of novel imaging-based monitoring procedures to accurately track the proton beam in the patient during treatment. The OncoRay partners are also working on a laser-based proton therapy. Further priorities at the Center lie in patient-oriented clinical research and the study of biomarkers for radiotherapy.

### The University of Pennsylvania School of Medicine

The University of Pennsylvania School of Medicine is one of the world's leading academic medical centers, dedicated to the related missions of medical education, biomedical research, and excellence in patient care. The Department of Radiation Oncology at Penn Medicine is one of the largest and most respected programs in the world. The comprehensive program provides patients access to nearly every option available to treat their cancer. The broad

range of radiation treatments available include proton therapy, intensity-modulated radiation therapy (IMRT), high-dose rate (HDR) and low-dose rate brachytherapy, partial breast irradiation, stereotactic radiosurgery (SRS) and Gamma Knife radiation. The department has an outstanding research program that provides patients with access to clinical trials that expand their treatment options.

### The Physikalisch-Technische Bundesanstalt (PTB)

The Physikalisch-Technische Bundesanstalt (PTB) is the National Metrology Institute of Germany with scientific and technical service tasks. PTB measures with the highest accuracy and reliability – metrology as the core competence.

For service and research in the field of dosimetry for external beam radiotherapy PTB operates an electron accelerator facility

in Braunschweig, Germany. Three accelerators offer excellent experimental possibilities for investigations with high-energy photon and electron radiation: from fundamental research to applications in hospitals. The linear accelerators available are two clinical accelerators and a research electron accelerator.

**Welcome to OMA!**



## Proton Therapy Network launch meeting with talk about OMA



**Proton Therapy Network is a new multidisciplinary community** bringing together clinicians, hospital physicists and radiographers, industry, patient representatives and policy makers with scientists and engineers from the engineering and physical sciences community in the UK. Through this network they will work together to establish a research base and national

infrastructure surrounding the government investment in proton therapy.

The first Launch Meeting of the Proton Therapy Network took place on 12<sup>th</sup> of December 2016 in Manchester, and included a talk by Prof. Carsten Welsch, OMA Coordinator, who presented research challenges in the field of medical accelerators and the OMA network.

## 3<sup>rd</sup> OMA Steering Committee meeting

**The third meeting of the OMA SC took place on 10<sup>th</sup> of January 2017 via a video conference.** The representatives of CNAO, IBA, GSI, US/CNA and University of Liverpool met to review the activities of the last 6 months and plan next project actions and events.

The discussion about past activities focused on recruitment, which was the major task for the project in the first twelve months and was successfully completed. The SC emphasised the engagement and collaboration of all the Beneficiaries in the recruitment process.

The ongoing activities debated included external and internal communication, career

development plans for the fellows, and the progress report, which has to be submitted to the European Commission to summarize the first year of project implementation.

The SC also discussed initial plans for OMA events in the autumn of 2017: OMA School on Monte Carlo Simulations and the Mid-term Review Meeting. The next communication activities were also agreed, including the project brochure and promotion at external events. The SC concluded the meeting with approving accession of PTB as an adjunct partner of the network.

The minutes of the meeting will be circulated to all Beneficiaries shortly.

## Medicine: Accelerate it!



The OMA network coordinator, Prof Carsten Welsch, gave a talk about the OMA project and the importance of medical accelerators in general at the BERTI Symposium in Munich on 19<sup>th</sup> January 2017. The talk focused on use of accelerators for medical purposes and research within the OMA framework that will lead to further developments in this field.

The BERTI Symposium is an event summarising three years of a Biomedical Imaging and Informatics - European Research and Training Initiative - a Network funded by the European Union and coordinated by Technische Universität München. BERTI has

trained 14 Early Stage Researchers within this interdisciplinary and intersectoral network of computer scientists, natural scientists, engineers, clinicians, and partners from industry.

Representatives of BERTI joined the OMA Kick-off Meeting in 2015 to share their experiences in the implementation of a European Training Network. The talk about OMA continues the exchange of good practice between two major European projects.

## OMA Events

### Reminder: OMA Complementary Skills School

3<sup>rd</sup> – 7<sup>th</sup> April 2017, University of Liverpool, UK

**The first gathering of OMA Fellows will take place in Liverpool, UK.** The one-week long training will be organized around the following main topics:

- Project management
- Presentation skills
- Scientific writing
- Peer review
- Team work
- Time management.

Accommodation has been booked for the OMA Fellows from Sunday 2<sup>nd</sup> April, to Friday

7<sup>th</sup> April (check out date). The school programme will start on Monday morning of 3<sup>rd</sup> April, so please arrange your arrival to Liverpool for Sunday 2<sup>nd</sup> April.

*Note that the UK is not within the Schengen area and so non-EU nationals working outside of the UK will need to apply for a UK visa in addition to their work permits. Please submit your visa application well in advance. If an invitation letter is required for visa application please e-mail OMA Project Manager Magda Klimontowska and she will provide you with it.*

### 1<sup>st</sup> OMA School - Medical Accelerators

#### Registration now open!

5<sup>th</sup> – 9<sup>th</sup> June 2017, Fondazione CNAO, Pavia, Italy

**The OMA consortium is organizing an international school on medical accelerators that is open for participants from within and outside the network.**

Renowned lecturers will complement partner expertise to cover topics such as beam generation, transport and delivery to the patient, as well as treatment schemes, beam extraction and clinical assessment of effectiveness. Current challenges related to beam diagnostics, imaging and patient issues will also be discussed.

In addition to the lectures there will be study groups, a poster session and a dedicated industry session. There will also be opportunities for discussion and networking at evening events, and a study tour to CNAO facilities.

Several scholarships for early stage researchers from outside the network will be available.

The cost for participation is €900 including accommodation and full board.

**Registration and further details:**  
<https://indico.cern.ch/event/595518/>



**Note:**  
**Participation in OMA Schools is obligatory for all OMA Fellows.**



## Other Events

### OMA at IPAC'17

OMA will be present at the 8th International Particle Accelerator Conference (IPAC) which takes place this year in Copenhagen, Denmark, from 9<sup>th</sup> to 14<sup>th</sup> May.

IPAC is the main annual event for the worldwide accelerator community and industry, with presentations of the latest

results from accelerator R&D and on the progress in existing, planned and future accelerator facilities.

The representatives of OMA will promote the project at the industrial exhibition.

**Visit us at Booth 20!**

### FCC Week 2017



In 2017 the FCC Week will take place in Berlin, Germany between May 29th and June 2nd. The registration and abstract submission is open, as well as application for the FCC Innovation Award via poster submission.

The annual meetings of the worldwide Future Circular Collider study (FCC) are major international events that review the progress in every domain which is relevant to develop

feasible concepts for a next generation frontier particle accelerate based high-energy physics research infrastructure. This 3rd meeting is jointly organised by CERN and DESY. It is also the annual meeting of the [EuroCirCol](#) EC Horizon 2020 Research and Innovation Action project.

For details and registration please check: <https://fccw2017.web.cern.ch/>

### Libera Workshop 2017

Instrumentation Technologies kindly invites you to join the Libera Workshop 2017, which will be held on June 1<sup>st</sup> 2017 in [Slovenia](#).

The Libera Workshop is one of the main opportunities to meet and exchange knowledge with experts in beam diagnostics and data acquisition systems for particle accelerators. Participants learn about new applications and digital

signal processing techniques based on the newly available technologies and have the chance to present the status of their projects. It is also an opportunity to attend a demonstration of one or more Libera solutions and take part in intensive training.

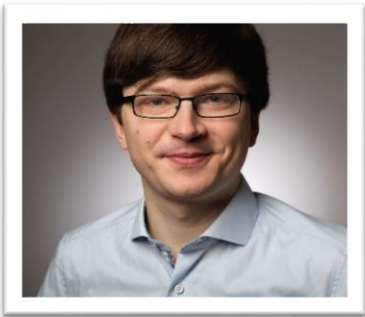
Please [contact Instrumentation Technologies](#) for more information.



## Fellows News

### Getting to know your Partners

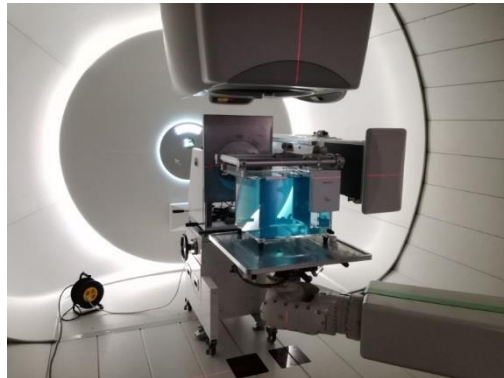
**Johannes Petzoldt**, a fellow based at Ion Beam Applications, has recently visited the partner organizations that will be closely involved in his project.



His first secondment was at the **University of Pennsylvania**. Johannes met the clinical partners, Dr. Teo and Dr. Xie, for the first time and discussed further strategies concerning the prompt gamma camera prototype. The device is used to determine the proton range and the first data acquisition during patient treatment with pencil beam scanning was performed at UPenn in June 2016. As part of the secondment the fellow learned to perform the temperature and energy calibration of the camera – a procedure necessary every couple of months to ensure proper functionality and, consequently, proton range retrieval. Supervised by Dr. Smeets the fellow performed successful calibration measurements, and the knowledge gained was summarized in a step-by-step manual. Additionally, the fellow took the opportunity to get an impression on the local site and the different treatment rooms.

Johannes also performed an experimental work in the IBA facility in Dresden in collaboration with the clinical partners of

**OncoRay**. One of Johannes' tasks within the project is to develop a model for a geometrical correction of the prompt gamma camera prototype, which depends on several parameters like camera setup and beam energy. To benchmark the model, experimental data under very specific conditions is required. The experiment was prepared together with the group of Dr. Richter and conducted in the gantry treatment room in a night shift. High positioning accuracy of 0.1mm could be achieved by using the X-ray system of the treatment room. The fellow not only learned how to control the beam and the camera, but also participated in the changing of the ion source of the cyclotron during the night shift.



Experimental setup at OncoRay, Dresden.

As a result, the necessary data was obtained in this experiment and will be analyzed back home in Louvain-la-Neuve.

Johannes found both visits very useful for the scientific development of his project, as well as establishing close links with the project partners.



PENN RADIATION ONCOLOGY



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 Radiation Research in Oncology  
 Dresden

## OMA Fellows contribute to Accelerator Experience Days



The Cockcroft Institute in Daresbury, UK, was recently overrun by 70+ school children (or future scientists) for the outreach Accelerator Experience Days. Several volunteers, amongst them OMA Fellows Ewa Oponowicz and Jacinta Yap, created an exciting and challenging day for the 12-15 year olds in an effort to encourage the pursuit of science as a career choice. With stimulated participation from local schools, the team of volunteers successfully managed to pique the interest of their junior guests and hopefully awaken some of their inner physicists.



Ewa explaining how to make a homemade salad bowl accelerator.

The students spent some time listening to an introductory talk, discussing the work of CI scientists presented in a form of posters and watching planned demonstrations of various experiments. However, the majority of the

day was spent challenging them to create their own. In a mad flurry of masking tape, magnets, batteries and salad bowls, the students excitedly worked in groups with the volunteers to prove themselves as capable young physicists. As the students enjoyed building homemade [salad bowl accelerators](#), [Van De Graaff Generators](#) and [railguns](#), several students were also tasked with both filming and editing videos documenting their experiments and the process of making them.



Jacinta supervising the experiment.

Each day ended with vibrancy as the students displayed posters and videos detailing and demonstrating their work on the experiments. The videos displayed the students success, creativity (and a sense of humour), which left the students, teachers and volunteers in high spirits at the end of the day.

## Back to School



**Ewa Oponowicz, OMA fellow based at the University of Manchester / Cockcroft Institute, gave an outreach talk to high school students in her hometown in Poland.**



Having briefly explained the principles of accelerators, Ewa introduced the students to research in this field by giving some impressive facts about the LHC, the largest and most powerful accelerator in the world. To show how wide the range of accelerator applications is, she presented several examples, starting with medicine, through cargo scanning to archaeology.

As the audience consisted of students who are about to choose their university and career path, they had plenty of questions - not only on the accelerators, but also about the general research opportunities and the young scientist career. Ewa spoke to them about the advantages of being a researcher and has stayed in touch with those particularly interested in science to answer the questions arising.

## Partner News

### AVA Network launched

The **Accelerators Validating Antimatter physics (AVA)** project started officially on the **1<sup>st</sup> January 2017**. AVA is an international collaboration of currently 25 institutions. Benefiting from almost 4 M€ of funding from the European Union, AVA will train no less than 15 early stage researchers over the next 4 years to carry out research into facility design and optimization, development of advanced Beam Diagnostics, and novel Antimatter experiments.

All project partners gathered for the project kick-off meeting organized on 11<sup>th</sup> – 13<sup>th</sup> January 2017 at the University of Liverpool.

The meeting was chaired by the network coordinator, Prof Carsten P. Welsch, who together with the [EU TEAM](#) introduced the partners to the specific rules and regulations of the Horizon 2020 framework, the project detailed time plan, events and the network wide communication and outreach plans.

**The AVA network is currently looking for candidates for its 15 vacant [Fellowship](#)**

**[positions](#) at institutions across Europe. The application deadline is 31<sup>st</sup> January 2017.**

Each researcher employed within the project will follow an innovative training program, similar to the one of the OMA network. There will also be opportunities to organize joint events and training for both OMA and AVA fellows, facilitating networking and new collaborations across the two networks.



*Participants at the AVA Kick-off Meeting.*

### 1<sup>st</sup> Spanish Workshop on Proton Therapy

**The 1<sup>st</sup> Spanish Workshop on Proton Therapy took place on 14<sup>th</sup> December 2016 at Universidad Complutense de Madrid, Faculty of Physical Sciences.**

It was organized to foster collaboration between radiotherapists, oncologists, radiologists, radiophysicists and researchers in the area of medical physics interested in proton therapy, in order to achieve optimal functioning of a future proton therapy facility

in Spain. The aim of the meeting was also to establish a common strategy for training of professionals in the field proton therapy.

OMA Beneficiary – Centro Nacional de Aceleradores made important contributions to the event, including a talk by Prof. Joaquín Gómez Camacho, Director of CNA and a member of the OMA Steering Committee.

## Vacancies



### **Early Stage Researcher fellowships within the AVA project**

Application deadline: 31<sup>st</sup> January 2017

More information can be found here: <https://www.liverpool.ac.uk/ava/vacancies/>

### **PhD opportunities in the Quasar Group**

Application deadline: 31<sup>st</sup> January 2017

More information can be found here: <https://www.liverpool.ac.uk/quasar/vacancies/vacancies/>

### **Positions available at COSYLAB**

COSYLAB is currently looking to hire 40 new medical systems engineers and other engineers in this field. If you have just finished your studies and are looking for new challenges, please feel free to drop us an email, we will be glad to see how our paths could cross. For more information please contact [jobs@cosylab.com](mailto:jobs@cosylab.com)

### **PhD position on laser-driven ion acceleration for fundamental and applied nuclear physics**

The Centre d'Etudes Nucléaires de Bordeaux Gradignan (France) (CENBG) and the Energie Matériaux Télécommunications Research Centre of the Institut National de Recherche Scientifique (INRS) located in Varennes in Quebec, Canada, have a common opening for a three year PhD position in joint supervision in the field of laser plasma ion acceleration starting from October 2017. For more information please have a look at: <http://www.cenbg.in2p3.fr/IMG/pdf/dual-phd-cenbg-inrs-2.pdf>.

The Los Alamos National Laboratory accelerator "LANSCE" is presently seeking candidates for a **Postdoctoral researcher position in the field of ion sources and injectors**. The full job advertisement can be found here: <http://www.lanl.gov/careers/career-options/jobs/all-jobs.php> Job number "IRC52093".

### **Opening for Work on an FCC Interaction Region**

CERN prepares in an international collaboration the design of a 100km ring accelerator complex, the FCC. Part of this study is the consideration of an electron-hadron collider experiment. There is an opening of a 2-years position at CERN, at fellow or scientific associate level, to pursue the design of the electron-hadron interaction region which links the electron beam, considered to be an energy recovery racetrack configuration tangential to the FCC tunnel, with the FCC hadron beam. Further information can be obtained from Oliver Bruening (CERN) and Max Klein (U Liverpool). [oliver.bruning@cern.ch](mailto:oliver.bruning@cern.ch), [max.klein@liverpool.ac.uk](mailto:max.klein@liverpool.ac.uk)

## OMA Events

April 3 <sup>rd</sup> – 7 <sup>th</sup> 2017	OMA Complementary Skills School, Liverpool, UK
June 5 <sup>th</sup> – 9 <sup>th</sup> 2017	1st OMA School – Medical Accelerators

## Other Events

May 14 <sup>th</sup> – 19 <sup>th</sup> 2017	IPAC'17, Copenhagen, Denmark
May 29 <sup>th</sup> – June 2 <sup>nd</sup> 2017	FCC Week 2017, Berlin, Germany
June 1 <sup>st</sup> 2017	Libera Workshop 2017, Slovenia
Aug 20 <sup>th</sup> – 24 <sup>th</sup> 2017	IBIC'17, Grand Rapids, MI, USA

## NOTICE BOARD

DEADLINE FOR THE NEXT NEWSLETTER CONTRIBUTIONS **10<sup>th</sup> April 2017**



[www.oma-project.eu](http://www.oma-project.eu)

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