

# CURRICULUM VITAE – ANGELO FURNO, PH.D.

## OCTOBER 2015

### PERSONAL INFORMATION

Name: Angelo  
Surname: Furno  
Nationality: Italian  
Work Address: INSA Lyon, Bâtiment CEI-2,  
56 Boulevard Niels Bohr CS 52132, 69603, Villeurbanne  
Home Address: 42 rue Turbil, 69003, Lyon  
Mobile: (+33) 0786677540  
E-mails: [angelo.furno@inria.fr](mailto:angelo.furno@inria.fr), [angelo.furno@insa-lyon.fr](mailto:angelo.furno@insa-lyon.fr), [angelofurno@gmail.com](mailto:angelofurno@gmail.com)  
Skype contact: angelo.furno  
Linked-in: <http://fr.linkedin.com/in/angelofurno/en>  
Website: [www.angelofurno.net](http://www.angelofurno.net)

### CURRENT POSITION

11/2014 – today *INRIA Post-doctoral fellow at INSA Lyon, CITI Lab, INRIA UrbaNet Team*  
69100 Villeurbanne, France

### RESEARCH EXPERIENCE

#### PH.D. in Information Engineering

Thesis defence date: 18<sup>th</sup> July 2014  
Thesis title: Scalable Service Composition in Autonomic Computing  
Ph. D. Advisor: Prof. Eugenio Zimeo  
Grade: Excellent

#### Fields of interest:

Mobile Data Analysis, Mobile Networking, Computer Networks, Distributed Systems, Service-Oriented Computing, Autonomic Computing, Software Engineering, Social Network Analysis, Semantic Web.

#### Specific research interests and contributions:

- Definition of an original approach for the analysis of mobile phone data to characterize groups of base stations with distinguishable behaviour, representative of diverse urban landscapes. The methodology has been used to study mobile traffic data from ten cities in Italy (Telecom Italia Big Data Challenge) and France (Orange). The results show the presence of urban fabrics common to many cities (e.g., related to office/commercial zones, residential neighbourhoods, transportation hubs and leisure areas. Also, very peculiar fabrics were observed in specific cities (e.g. Paris metro Stations, Vatican city, Stadiums, etc.). Our approach can be exploited for social studies, automatic land use detection and network management operations.
- Development of a framework for the analysis of mobile operator data to detect profiles of the typical user demand, and identifying unusual situations in network-wide usages. The framework has been evaluated on two real-world mobile traffic datasets (Orange D4D and Telecom Italia Challenges), showing its ability to extract meaningful mobile demand profiles characterizing different moments of the day exhibiting well-characterized traffic patterns. In addition, the proposed framework singles out a large number of outlying behaviours, which can be mapped to social events or technical issues in the network. This kind of information can be used to build dynamic network-aware strategies for efficiently managing network resources.

- Research and development of a recommendation system for social shopping. Design, implementation and evaluation of algorithms and techniques for mining user profiles from Social Network data (e.g. Facebook, Linked-In, etc.). NoSQL graph databases (i.e. Neo4J) have been used to efficiently store and traverse social network data.
- Applications of graph theory and information retrieval techniques to social graphs for performing social network analysis, personalized recommendation and elicitation of opinion leaders for on-line commerce. Use of real-time analytics frameworks (e.g. Spark and Storm) to handle distributed and fault-tolerant real-time computation of big data. Development of personalized product recommendation techniques, based on collaborative filtering, content-based filtering, opinion leadership elicitation, community detection.
- Development of original search techniques for automatic, fully-decentralized and cooperative approach for service composition and discovery in Unstructured P2P networks. Each peer can host service descriptions (i.e., both semantic and structural) in a local registry, expose them to the Web for service discovery/composition and relay received service goal queries. A bidirectional search strategy has also been proposed for finding service gaps in retrieved partial solutions and suggesting them as business opportunities to service providers.
- Development of a gossip-based probabilistic forwarding algorithm that uses different sources of knowledge, such as network density and service grouping, to reduce the amount of messages exchanged in P2P networks to perform automatic service composition. Results observed in a simulated environment, over large-scale networks with different topologies, confirm the benefits of the proposed approach in reducing both resolution times and message overhead with respect to more structured solutions and flooding-based strategies, respectively.
- Adoption of offloading techniques and related declarative language to improve data transfers in Service Oriented Architectures. Conditional and learning lazy-transfer mechanisms allow for reducing message overhead only to the cases when communication is actually or likely to be necessary to service consumers.
- Research and development of planning and knowledge discovery approaches for automatic Web service composition, by using Business Processes Definition languages (e.g. XPDL, WS-BPEL) to describe executable processes, Artificial Intelligence planning techniques to explore service search space, Semantic Web languages and ontologies to semantically describe services (Input, Output, Pre-Conditions and Effects, i.e. IOPE semantics) and Autonomic Computing solutions to support dynamic process re-configuration.
- Development of an industrial tool for supporting automatic composition of semantically described services. The tool allows for the automatic generation of concrete and executable WS-BPEL business processes invoking WSDL Web services. WSDL interfaces are published in a UDDI registry and semantically described by means of OWL-S files. The generated business process satisfies the user-specified service goal, semantically described according to the IOPE semantics (i.e. desired outputs/effects, available inputs/pre-conditions), and can be directly executed on traditional business process engines (e.g. JBoss Riftsaw, Apache ODE, etc.). ECA (Event, Condition, Action) rules support the autonomic re-configuration of the processes.
- Definition of a design approach for context representation based on a semantic model (OWL-Ctx). An extension of the OWL-S ontology for service description (OWL-SC) has been developed to enrich the expressiveness of each section of a typical OWL-S semantic service description, by means of context conditions and adaptation rules. Context-aware descriptions are exploited by the composition tool to automatically find the atomic or composite services that can be better-tuned to the requestor's behaviours/preferences and to the particular situations of the surrounding environment.
- Design and development of an OWL Quality of Services (QoS) ontology (onQoS) to provide a language for semantic QoS descriptions in OWL-S service profiles and of a related non-functional semantic matchmaker for improving the precision of an OWL-S based functional semantic matchmaker.

## **PROFESSIONAL EXPERIENCE**

- 7/2014 – 10/2014 *Post-doctoral fellow at University of Sannio, Department of Engineering*  
82100 Benevento, Italy
- 3/2011 – 7/2014 *Ph.D. Student at University of Sannio, Department of Engineering*  
82100 Benevento, Italy
- 6/2012 – 11/2012 *Software Researcher Contract work*  
CO.E-COM SRL E-Commerce Company (www.coecom.com),  
Via Teatro Romano n.12, 82100 Benevento, Italy
- 7/2010 – 3/2011 *Research Associate*  
Department of Engineering - University of Sannio,  
82100 Benevento, Italy
- 4/2006 – 9/2006 *Bachelor's degree pre-graduation internship*  
Research Centre on Software Technology - University of Sannio,  
82100 Benevento, Italy

## **PROFESSIONAL MEMBERSHIPS**

- 3/2014 – today IEEE, IEEE Smart Cities Communities, IEEE Young Professionals Member

## **FELLOWSHIPS, HONOURS AND AWARDS**

- 09/2015 **Finalist in the TIM BIG DATA CHALLENGE 2015 Edition** (Rome, 21<sup>st</sup> Sept 2015, Italy), with the project “Mobile Traffic Signature in the Urban Landscape”  
<http://www.telecomitalia.com/tit/en/bigdatachallenge/news-social/tim-big-data-challenge-2015-finalisti/Mobile-Traffic-Signatures-in-the-Urban-Landscape.html>
- 11/2014 – 3/2016 **INRIA Post-doctoral Fellowship** – ABCD project, grant ANR-13-INFR-0005
- 3/2011 – 3/2014 **3-years Ph. D. Fellowship** – MIUR, Italian Minister for Education and Research.
- 11/2012 **Best Paper Award** for the paper “Context-Aware Design of Semantic Web Services to Improve the Precision of Compositions”, Angelo Furno, Eugenio Zimeo, in ICCASA 2012 (International Conference on Context-Aware Systems and Applications) – Ho Chi Minh City, Viet Nam, November 2012.

## **EDUCATION**

- 7/2014 University of Sannio, Benevento, Italy Ph.D., Information Technology
- 4/2010 University of Sannio, Benevento, Italy M.D., Information Technology,  
*cum laude*
- 10/2006 University of Sannio, Benevento, Italy B.A., Information Technology,  
*cum laude*

## **SCIENTIFIC VISITING AND ABROAD EXPERIENCE**

- 11/2011 – 01/2012 Advanced Courses attended during Ph.D. at the Department of Electronics and Information (DEI), Politecnico di Milano, Italy: Adaptive Services, Search Computing, Context-awareness in Database Systems, Agents and Multi-agents Systems, Computer Systems Performance Evaluation, Data Warehouse, Data Mining, Distributed Systems.
- 08/2008 – 01/2009 Participation to the Erasmus Programme (6 months) in Stockholm, Sweden, at Kungliga Tekniska Högskolan, Royal Institute of Technology.

Attended courses and exams: Modern Methods in Software Engineering, Semantics for Programming Languages, Distributed Systems.

## **TEACHING ACTIVITIES**

### **Undergraduate Courses**

- 2015 – 2016            Lab Sessions (TP) for the courses on Networks (Net), Networking, Operating Systems and Programming (PRS) at INSA Lyon, Department of Telecommunication.
- 11/2015 – 12/2015    Lectures for the course on Networks (Net2) at INSA-Lyon, IST (Information Science and Technology Semester).
- 2011 – 2014            Teaching Assistant for the courses on Computer Networks, Network Systems Programming, Web Technologies and Programming Languages at University of Sannio, Department of Engineering.

### **Graduate Courses**

- 2011 – 2014            Teaching Assistant for the course on Distributed Systems at University of Sannio, Department of Engineering.

## **MENTORING**

### **Undergraduate Students**

*Danilo Cianciulli:* I mentored Danilo from June 2012 until May 2013, as he completed his Department of Engineering undergraduate senior thesis at University of Sannio, entitled “SNOOPER: a Framework for Extracting Profile Data from Social Networks”. This included training him in basic design patterns for abstracting the data persistence layer and methodologies for designing architectures for Web-based complex enterprise systems (Model-View-Controller pattern, Service Oriented Architectures, Enterprise Service Bus (ESB)); supporting him in learning the OAuth open standards for authorization to interact with Social Networking Systems. Danilo was able to develop an extensible (with respect to different Social Networking Websites) Java subsystem (SNOOPER) to extract users’ data from social networks and store them in a graph database (Neo4J).

*Ermanno Sannini:* I mentored Ermanno from December 2012 until May 2013. During this time, he accomplished his Department of Engineering undergraduate senior thesis at University of Sannio, entitled “Recommendation Algorithms for Social e-Commerce System”.

I supported Ermanno in continuing Danilo’s work in the context of a social shopping system by exploiting data extracted from Social Networks by means of SNOOPER, and applying information retrieval techniques to infer similarities between user profiles and product descriptions, stored in non-relational databases. I trained Ermanno on how to use the Apache Lucene library for information retrieval and free text search, the Gremlin traversal language to explore graph databases and I helped him in devising the main ideas for his recommendation algorithms.

*Erminia Dello Buono:* I mentored Erminia from January through September 2013, leading her to complete her Department of Engineering undergraduate senior thesis at University of Sannio, entitled “Analysis of techniques for Friendship Leaders Elicitation from Social Networks”. I trained Erminia on graph theory, clustering algorithms and centrality measures, NoSQL DBMS traversal languages (Gremlin, Cypher) and Groovy scripting language to implement and apply efficient clustering algorithms on social graphs (edge betweenness, Louvain method and K-means clustering). Erminia was able to identify effectively friendship communities and related opinion leaders by

applying her clustering algorithms to large-size friendship graphs, retrieved from Facebook (by means of the SNOOPER framework) and stored in Neo4J graph databases.

*Francesco Sorice:* I mentored Francesco from September 2013 until March 2014 during his work at the Department of Engineering of University of Sannio undergraduate senior thesis, entitled “The digitalization process in Public Administration”. I trained Francesco on Service Oriented Architectures, Web architectures and technologies, leading him to critically analyse the evolution of National and International Public Administrations regarding data transparency and service offering to the citizen on the Web. Francesco noticed the technological shift from a service-centric perspective to a data-centric one in public administration, analysed the recently proposed Unified Service Description Language (USDL and Linked USDL) for semantic service descriptions and developed test applications using open data APIs (offered by CKAN and SOCRATA data management systems).

*Giuseppe Liberale:* I mentored Giuseppe from September 2014 until January 2015 during his internship at the Department of Engineering of University of Sannio, concluded by his thesis entitled “Meta-gadgets for discovery of interactive services in social communities”. Giuseppe was trained to the learning of the basic architectural patterns and algorithmic solutions that can be exploited in social networking systems to support the delivery of services to user communities. Giuseppe was able to develop recommendation gadgets and integrate them in a Web prototypal portal for the Italian Public Administration. The proposed solutions are aimed at supporting the continuous delivery of new services satisfying actual user requirements, by searching for and notifying technological experts, whose skills are retrieved from LinkedIn and might be helpful to develop such services.

*Amel Meratbene:* I mentored Amel at CITI Lab in Lyon, from January until June 2015 during her internship at INSA Lyon. I trained her on mobile data analysis fundamentals, supported by the usage of mathematical methods, programming tools and libraries.

## **JOURNAL REVIEWER**

Journal of Software: Evolution and Process, ISSN: 2047-7481, © John Wiley & Sons, Ltd  
Journal of Expert Systems with Applications, ISSN: 0957-4174, © Elsevier  
Journal of Computers & Electrical Engineering, ISSN: 0045-7906, © Elsevier

## **PROJECT PARTICIPATIONS**

ABCD - French National Research Agency, grant ANR-13-INFR-0005  
Regione Campania POR - MyOpenGov (<http://myopengov.eng.it/>) (2007-2013)  
MIUR FIRB - ArtDeco (<http://artdeco.elet.polimi.it/>) (2005-2009)  
MIUR PON - SIEGE (2008-2010), Research agreement  
Regione Campania POR - GLOBE (2007-2009)

## **LANGUAGE SKILLS**

Italian (mother tongue), English (fluent), French (professional proficiency).

## **PUBLICATIONS**

### **Papers in Refereed Journals**

- Mobile Demand Profiling for Cognitive Networking, Angelo Furno, Diala Naboulsi, Razvan Stanica and Marco Fiore. [*submitted* on September 2015].

- Self-scaling cooperative discovery of service compositions in unstructured P2P networks. Angelo Furno, Eugenio Zimeo. In *Elsevier Journal of Parallel and Distributed Computing* (JPDC), Volume 74, Issue 10, pp. 2994–3025. 2014, October. March 2014. doi:10.1016/j.jpdc.2014.06.006
- Context-aware Composition of Semantic Web Services. Angelo Furno, Eugenio Zimeo (2014, March). In *Springer Mobile Networks and Applications Journal* (MONET), Special Issue on Context-aware Systems and Applications, pp. 235-248. March 2014. doi: 10.1007/s11036-014-0494-y.
- Automatic Generation of Concrete Compositions in Adaptive Contexts – Luca Bevilacqua, Angelo Furno, Vladimiro Scotto di Carlo, Eugenio Zimeo. In *Mediterranean Journal of Computers and Networks* (MEDJCN), Volume 8, Issue No. 4, October 2012.

### **Papers in Conference Proceedings**

- A Comparative Evaluation of Urban Fabric Detection Techniques Based on Mobile Traffic Data – Angelo Furno, Razvan Stanica and Marco Fiore. In *Advances in Social Networks Analysis and Mining* (ASONAM), 2015.
- Gossip Strategies for Service Composition – Angelo Furno, Eugenio Zimeo. In 22<sup>nd</sup> Euromicro International Conference on *Parallel, Distributed and Network-Based Processing* (PDP), 2014.
- Towards Effective Event-Driven SOA in Enterprise Systems – Quirino Zagarese, Angelo Furno, Gerardo Canfora, Eugenio Zimeo. In IEEE International Conference on *Systems, Man and Cybernetics* (SMC), 2013, October.
- Efficient Cooperative Discovery of Service Compositions in Unstructured P2P Networks – Angelo Furno, Eugenio Zimeo. In 21<sup>st</sup> Euromicro International Conference on *Parallel, Distributed and Network-Based Processing* (PDP), 2013, February.
- Context-Aware Design of Semantic Web Services to Improve the Precision of Compositions – Angelo Furno, Eugenio Zimeo. In Springer 1<sup>st</sup> International Conference on *Context-Aware Systems and Applications* (ICCASA), 2012, November – BEST PAPER AWARD.
- A Tool for Automatic Generation of WS-BPEL Compositions from OWL-S described services – Luca Bevilacqua, Angelo Furno, Vladimiro Scotto di Carlo, Eugenio Zimeo. In 5th International Conference on *Software, Knowledge Information, Industrial Management and Applications* (SKIMA), 2011, September.

### **Papers in Work in Progress/Ph.D. Forum Proceedings**

- P2P Architectures for Semantic Service Composition - Angelo Furno, Eugenio Zimeo (2014). In 22<sup>nd</sup> Euromicro International Conference on *Parallel, Distributed and Network-Based Processing* (PDP), 2014 - Work In Progress Section, ISBN 978-3-902457-39-4.
- Enhancing Web Process Self-awareness with Context-aware Service Composition – Angelo Furno, Eugenio Zimeo. In IEEE International Conference on *Self-Adaptive and Self-Organizing Systems* (SASO) – Ph.D. Forum, 2012, September.