


Domenico SIRACUSA

Senior Researcher | Head of RiSING Research Unit, FBK CREATE-NET

 Italian nationality | Birth date:

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Domenico Siracusa is the head of the RiSING research unit at FBK CREATE-NET. Previously he was senior researcher and deputy head of the FuN research unit at CREATE-NET. He received his Master's Degree in Telecommunication Engineering and his PhD in Information Technology both at Politecnico di Milano, respectively in 2008 and 2012.

His current research interests include orchestration of next generation Internet infrastructures, cloud and fog computing, SDN/NFV and virtualization, security and robustness.

Domenico authored more than 70 publications appeared in international peer reviewed journals (such as Journal of Lightwave Technology, Journal of Optical Communications and Networking, IEEE Communications Magazine, IEEE Systems Journal, etc...) and in major conferences on networking technologies.

Domenico acted as proposal leader and scientific manager for both competitive EU-funded projects and commercial activities with important telecommunication vendors. He is project manager and technical leader of the H2020 ACINO project and was involved as principal investigator, workpackage leader or contributor in other FP7/H2020, EIT digital and commercial projects.

Domenico is very active in the scientific community, acting as member of the Technical Program Committee of conferences, being reviewer of highly cited journals and participating to standardization committees and open-source initiatives.

Current Position

January 2018 | **Head of Research Unit, FBK CREATE-NET, Trento, Italy**

Robust and Secure Distributed Computing, RiSING

As head of a research unit, main tasks include: definition of the scientific direction, coordination of research and development activities, personnel management and fund raising.

RiSING unit aims to investigate and implement smart, autonomic and anti-fragile methods and platforms to enhance resiliency, dependability and security of distributed computing infrastructures covering the whole the cloud-to-things continuum.

Fog computing Security Robustness Anti-fragility

Education

March 2012 | **PhD (cum laude) in Information Technology, Politecnico di Milano, Milan, Italy**

January 2009

- > PhD Thesis: Architectures, methods and algorithms to control switching in optical networks
- > Advisor: Prof. Achille Pattavina | Co-Advisor: Prof. Guido Maier
- > Department of Electronics and Information

December 2008 | **Master's Degree (M.Sc.) in Telecommunications Engineering, Politecnico di Milano, Milan, Italy**

September 2005

- > Master's Thesis: Carrier Ethernet networks: planning and optimization methods
- > Advisor: Prof. Achille Pattavina | Co-Advisor: Prof. Guido Maier
- > Department of Electronics and Information

September 2005 | **Bachelor's Degree (B.Sc.) in Telecommunications Engineering, Politecnico di Milano, Milan, Italy**

September 2002

- > Bachelor's Thesis: Security of Internet voice calls: issues and future developments
- > Advisor: Prof. Flavio Giovanelli | Co-Advisor: Prof. Sara Grilli
- > Department of Electronics and Information | CEFRIEL Technology Transfer Institution

July 2002 | **High School, Liceo Scientifico Leonardo da Vinci, Agrigento, Italy**

September 1997

Professional and Research Experience

December 2017 July 2016	Deputy Head of Research Unit, CREATE-NET (FBK CREATE-NET from 2017), Trento, Italy <i>Future Networks, FuN</i> Support to the coordination of the FuN research unit (approximately 25 persons) and to the definition of its research directions. Technical leadership of a group investigating novel solutions for network and service management, software-defined transport technologies and infrastructure virtualisation. <ul style="list-style-type: none">> Project proposal leadership> Principal investigator of commercial projects> Project coordination and workpackage leadership of EU-funded projects
July 2016 July 2013	Researcher, CREATE-NET, Trento, Italy <i>ENGINE area, Future Networks area</i> Researcher of the ENGINE area and, since 2014, technical leader of a group within the Future networks area engaged in research and development activities on control and management of optical transport networks. <ul style="list-style-type: none">> Project proposal preparation (as contributor and leader)> Technical leadership of commercial projects> Project coordination and workpackage leadership of EU-funded projects
July 2013 January 2012	Post Doc Researcher, CREATE-NET, Trento, Italy <i>ENGINE area</i> Main research activities focused on the investigation of novel methods and algorithms to introduce cognition in optical transport networks, study of flexi-grid optical technologies and development of simulation environments. <ul style="list-style-type: none">> Contributions to project proposals> Participation in EU and commercial projects as contributor
July 2011 March 2011	Teaching assistant, Politecnico di Milano, Milan, Italy <ul style="list-style-type: none">> “Piattaforme Software per la rete” (Network Software platforms)> Master course for Telecommunication Engineering students
February 2011 September 2010	Teaching assistant, Politecnico di Milano, Milan, Italy <ul style="list-style-type: none">> “Reti di comunicazione e Internet” (Communication Networks and Internet)> Undergraduate course for Computer Science students
September 2010 April 2010	Visiting PhD Student, Universitat Politècnica de Catalunya, Barcelona, Spain <ul style="list-style-type: none">> Topic: Impact of physical layer impairments on Carrier Ethernet control plane schemes (FP7 BONE project)> Hosting professor: Prof. Josep Solé Pareta> Departament d'Arquitectura de Computadors
July 2006 March 2006	Teaching assistant, Politecnico di Milano, Milan, Italy <ul style="list-style-type: none">> “Laboratorio di reti delle telecomunicazioni” (Telecommunication Networks Lab)> Undergraduate course for Computer Science students

Participation to funded projects

December 2018 January 2018	EIT Digital DIGIFLOW, Digitizing Industrial Workflow, Monitoring and Optimization <i>Project Manager</i> Digiflow is an EIT Digital funded project that aims at tracking the movement of assets and workforce in the shop floor so as to digitize and monitor in real-time industrial workflows' progress. In this context, a Fog Computing Platform (Foggy) will be transferred to a real industrial context for collecting and elaborating the data close to the user and the data source. Relevant industrial partners are: Santer Reply, ThinkINside srl. Fog computing Industry 4.0 Workload orchestration
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- January 2018

Commercial project | LBO, Local Bandwidth Optimization
Principal investigator

The goal of the Local Bandwidth Optimization (LBO) project is to study the benefits of decentralized methods for the optimization of bandwidth in large Internet Service Provider (ISP) networks. To this account, this project builds up on previous theoretical studies to formalize and evaluate decentralized solutions for bandwidth optimization based on purely distributed or clustered approaches and leveraging the Segment Routing concept with the aim of (i) providing scalability in terms of fast and frequent re-optimization, (ii) avoiding a single point of failure, and (iii) ensuring feasibility when the network is oblivious of the full/partial traffic demands.

The project is funded by Cisco by means of University Research Program (URP) funding.

SDN Traffic engineering Decentralised optimisation

- September 2016

Commercial project | BEEHIVE, Clustered Traffic Engineering in large ISP Networks
Principal investigator

The goal of BEEHIVE is to empower the optimization of large Internet Service Provider (ISP) networks, especially in the cases in which the operator requires the reactivity and the resiliency of distributed control solutions, while achieving a level of performance comparable to centralized control designs.

The project is funded by Cisco by means of University Research Program (URP) funding.

SDN Traffic engineering Distributed optimisation

- December 2018
May 2016

H2020 | GN4-2, Gèant 4 - Phase 2
Contributor | Internal leader

The GÉANT Project operates the pan-European GÉANT network, delivering advanced multi-domain services and facilitates joint-research activity that drives innovation. The overall objective is to provide a stable, though innovative environment for the growth of the GÉANT network as the European Communications Commons for the European Research Area (ERA), providing the best possible infrastructure to ensure that Europe remains in the forefront of research.

Relevant industrial partner: GARR.

Data plane programming Transport networks Network stacks

- January 2018
January 2015

H2020 | ACINO, Application Centric IP/Optical Network Orchestration
Project Manager

ACINO (Application Centric IP/Optical Network Orchestration) proposes a novel application-centric network concept, which differentiates the service offered to each application all the way down to the optical layer, thereby overcoming the disconnect that the grooming layer causes between service requirements and their fulfillment in the optical layer. This allows catering to the needs of emerging medium-large applications, such as database migration in data centers. To realize this vision, ACINO aims to develop an open source, vendor-agnostic modular orchestrator, which will expose to applications a set of high level primitives for specifying service requirements, and then perform multi-layer (IP and optical) planning and optimization processes to map these requirements into a set of lightpaths. The orchestrator will also be able to perform re-optimization, by means of a novel online in-operation planning module. ACINO's approach directly addresses the lack of dynamic control of optical networks, by automating planning and configuration tasks, and tackles the limitations in inter data center connectivity by allowing applications to request detailed and complex custom services to be provisioned in a timely manner. Overall, ACINO's open source and vendor-agnostic approach will foster the emergence of open industry standards.

Relevant industrial partners: Telefonica, ADVA Optical Networking, Sedona Systems.

Application centricity SDN IP/Optical networks

- December 2017
July 2015

H2020 | 5G CROSSHAUL, The 5G Integrated fronthaul/backhaul
Contributor

The 5G-CROSSHAUL project aims at developing a 5G integrated backhaul and fronthaul transport network enabling a flexible and software-defined reconfiguration of all networking elements in a multi-tenant and service-oriented unified management environment. The Xhaul transport network envisioned will consist of high-capacity switches and heterogeneous transmission links (e.g., fibre or wireless optics, high-capacity copper, mmWave) interconnecting Remote Radio Heads, 5GPoAs (e.g., macro and small cells), cloud-processing units (mini data centres), and points-of-presence of the core networks of one or multiple service providers. This transport network will flexibly interconnect distributed 5G radio access and core network functions.

Relevant industrial partners: Telefonica, NEC, Ericsson, Atos, Nokia.

5G SDN/NFV Fronthaul & backhaul transport network

July 2017	FP7 INSPACE, Spatial-Spectral Flexible Optical Networking: Enabling Solutions for a Simplified and Efficient SDM
February 2014	<p data-bbox="352 181 571 210"><i>Workpackage leader</i></p> <p data-bbox="352 215 1477 562">INSPACE proposes a novel networking approach by extending the established spectral flexibility concepts to the SDM (Space Domain Multiplexing) domain and significantly simplifying the super-channel allocation and control mechanisms, by removing current limitations related with the wavelength continuity and fragmentation issues. The new concept utilises the benefits of the high capacity, next generation, few-mode/multi-core fiber infrastructures, providing also a practical short term solution, since it is directly applicable over the currently installed multi-fibre cable links. The realisation of INSPACE approach is enabled by the development of novel multi-dimensional spatial-spectral switching nodes, which are fabricated by extending the designs of the existing flexible WSS nodes, incorporating advance mode/core adapting techniques. The concept is further supported by novel processing techniques that minimise the mode/core interference as well as new network planning algorithms and control plane extensions that are enhanced with the space dimension.</p> <p data-bbox="352 566 1174 595">Relevant industrial partners: Telefonica, Optoscribe Ltd, OpSys Technologies.</p> <p data-bbox="352 600 906 622">Spatially-Spectrally Flexible Optical Networking SDM SDN</p>
April 2016	Commercial project VIRTICAL, Network Virtualization in Flexible Optical Networks
March 2015	<p data-bbox="352 692 528 721"><i>Technical leader</i></p> <p data-bbox="352 725 1477 1003">Network Virtualization (NV) has been introduced to overcome the so called network "ossification", which prevents the seamless provisioning of services on top of dynamic, open and programmable substrate infrastructures. In such context, the providers of optical transport services are expected to greatly benefit from the agility NV promised to introduce in the management of the underlying infrastructure. Unfortunately, NV on top of optical networks is still not fully deployed, due to various open issues related to the proposed architecture, the mechanisms and the policies. Such issues are addressed by the VIRTICAL project, which strongly leverages on the knowledge of the most recent technological solutions (e.g. flexible optical networks) to provide a Hybrid SDN/GMPLS Control Plane for Optical Virtual Private Networks with Restoration Capabilities.</p> <p data-bbox="352 1008 1283 1037">The project is funded by Cisco by means of University Research Program (URP) funding.</p> <p data-bbox="352 1041 863 1066">Network Virtualization SDN Flexible optical networks</p>
December 2016	FP7 NetIDE, An integrated development environment for portable network applications
January 2014	<p data-bbox="352 1135 475 1164"><i>Contributor</i></p> <p data-bbox="352 1169 1477 1476">Nowadays, while most of the programmable network apparatus vendors support OpenFlow, a number of fragmented control plane solutions exist for proprietary software-defined networks. Thus, network applications developers need to re-code their solutions every time they encounter a network infrastructure based on a different controller. Moreover, different network developers adopt different solutions as abstract control plane programming language (e.g. Frenetic, Nettle), leading to not reusable and shareable source code for network programs. So despite having OpenFlow as the candidate for a standard interface between the controller and the network infrastructure, interworking between different controllers and network devices is hindered and walled gardens are emerging. NetIDE will deliver a single integrated development environment to support the whole development lifecycle of network controller programs in a vendor-independent fashion.</p> <p data-bbox="352 1480 943 1509">Relevant industrial partners: Telefonica, Fujitsu, Thales.</p> <p data-bbox="352 1514 679 1541">SDN IDE Memory management</p>
October 2016	FP7 PRISTINE, Programmability In RINA for European supremacy of virTualised NETworks
January 2014	<p data-bbox="352 1610 475 1639"><i>Contributor</i></p> <p data-bbox="352 1644 1477 1856">RINA (Recursive Internet Architecture) unifies distributed computing and networking, since networking is just a distributed application: distributed computing specialized to provide IPC services. PRISTINE aims to (i) investigate the application of this recursive, programmable framework in a set of industry-lead, heterogeneous usage scenarios from different parts of the networking value-chain; (ii) program mechanisms and techniques that will provide enhanced network performance, security, reliability and management; (iii) show that a clean-slate architecture can be deployed in the current infrastructure and interoperate with the current Internet.</p> <p data-bbox="352 1861 1031 1890">Relevant industrial partners: Telefonica, Ericsson, Atos, Juniper.</p> <p data-bbox="352 1895 635 1917">RINA Clean slate networking</p>

December 2015 January 2015	<p>EIT Digital SDN@EDGE <i>Contributor</i></p> <p>The overall goal of this activity funded by the EIT ICT Labs is about accelerating the exploitation of SDN (Software Defined Networking) and NFV (Network Functions Virtualization) in order to produce business impacts (even in the short- medium term) at the edge of fixed networks (aggregation, access segments up to end Users premises) and in the access mobile networks (mobile backhaul and aggregation network). Relevant industrial partners: Telecom Italia.</p> <p>SDN NFV Business impact</p>
September 2016 October 2012	<p>FP7 FED4FIRE Open Call for Innovative Experiments Additional Experimentation Facilities, Providing Performance Isolation in Multi-tenants data-centres (MyFIRE) <i>Contributor</i></p> <p>Fed4FIRE is an Integrating Project under the European Union's Seventh Framework Programme (FP7) addressing the work programme topic Future Internet Research and Experimentation. The project is performed by a consortium of 17 partner organisations from 8 countries. In this context, an experimental activity is proposed with a twofold aim: (i) to demonstrate the fundamental limitations of current network virtualization techniques in realistic setting by leveraging a physical infrastructure; (ii) to deliver an effective and efficient performance isolation solution for virtualized multi-tenants facilities.</p> <p>Network virtualization SDN Performance isolation</p>
September 2014 October 2013	<p>Commercial project AGISCO, Toward an AGile control plane in Spectrum switChed Optical networks based on hybrid centralized/distributed architectural solutions <i>Technical leader</i></p> <p>The scope of AGISCO project is to undertake the evolutionary path to the exploitation of some centralized functionalities in the control plane of SSONs, by proposing architectural solutions and dynamic algorithms aimed at improving the management of flexible networks and the utilization of physical resources. The project is funded by Cisco by means of University Research Program (URP) funding.</p> <p>SDN Flexible optical networks Control plane</p>
September 2013 July 2010	<p>FP7 CHRON, Cognitive Heterogeneous Reconfigurable Optical Network <i>Contributor</i></p> <p>The CHRON project proposes a Cognitive Heterogeneous Reconfigurable Optical Network, which observes, acts, learns and optimizes its performance, taking into account its high degree of heterogeneity with respect to QoS, transmission and switching techniques. The aim of CHRON is to develop and showcase a network architecture and a control plane which efficiently use resources in order to minimize CAPEX and OPEX while fulfilling QoS requirements of each type of service and application supported by the network in terms of bandwidth, delay and quality of transmission, and reducing energy consumption. Relevant industrial partners: Huawei, Orange Polska.</p> <p>Cognitive Optical Networks Artificial intelligence Control plane</p>
March 2013 April 2012	<p>Commercial project FLEXIGO <i>Contributor</i></p> <p>The goal of the FLEXIGO research project is to design and assess distributed architectures, algorithms, and techniques for the optical control plane, which can handle the flexible spectrum technology.</p> <p>Flexible optical networks Control plane</p>
December 2012 January 2010	<p>FP7 STRONGEST, Scalable, Tunable and Resilient Optical Networks Guaranteeing Extremely-high Speed Transport <i>Contributor</i></p> <p>STRONGEST's main objective is to design and demonstrate an evolutionary ultra-high capacity multilayer transport network, compatible with Gbit/s access rates, based on optimized integration of Optical and Packet nodes, and equipped with a multi-domain, multi-technology control plane. This network will offer: high scalability and flexibility, a guaranteed end-to-end performance and survivability, an increased energy efficiency and a reduction of total cost of ownership. Relevant industrial partners: Telecom Italia, Telefonica, British Telecom, Nokia, Ericsson.</p> <p>Transport networks Control Plane</p>

February 2011
January 2008

FP7 | BONE, Building the Future Optical Network in Europe: The e-Photon/ONe Network

Contributor

The BONE-network brings together 49 laboratories and research institutes from all over Europe in a close networking infrastructure, built on the foundations laid down by the FP6 ePhoton/ONe Network, and represents the research activities within Europe in the field of Optical Networks. The core activity of the BONE-project is the stimulation of intensified collaboration, exchange of researchers and integration of activities and know-how into and amongst partners. Through the establishment of Virtual Centres of Excellence, the BONE-project looks into the future and builds and supports the final "Network of the Future" through education & training, research tools & testlabs on new technologies & architectures.

Relevant industrial partners: Ericsson, France Telecom, Huawei.

Optical networks

Editorial Work and Community Service

- > Program Chair for OSA Advanced Photonics Conference - Photonics Networks and Devices 2018
- > Technical Program Committee Member for: 27th European Conference on Networks and Communications (EuCNC 2018), 22th Conference on Optical Network Design and Modeling (ONDM 2018), OSA Advanced Photonics Conference - Photonics Networks and Devices 2017, 21th Conference on Optical Network Design and Modeling (ONDM 2017), 20th Conference on Optical Network Design and Modeling (ONDM 2016), 20th European Conference on Networks and Optical Communications (NOC 2015), 19th Conference on Optical Network Design and Modeling (ONDM 2015), Photonics in Switching 2015, 19th European Conference on Networks and Optical Communications (NOC 2014)
- > Organizer and Co-Chair of the Workshop on Multi-Layer Network Orchestration (NetOrch), co-located with ICTON 2016
- > Reviewer of the following highly-cited international journals: Journal of Lightwave Technology (JLT), Journal of Optical Communications and Networking (JOCN), Computer Communications, Computer Networks, etc.
- > Participation to Standardization activities within the IETF organisation (contribution to two Internet-drafts for standardisation of new technological solutions)
- > Member of the ONOS Community Steering Team and Ambassador Steering Committee (2016-2017)

Invited Talks

- > July 24th 2017, OSA Advanced Photonics Congress (Photonic Networks and Devices), New Orleans, "Yamato: an SDN Platform to Control and Virtualize Spectrally and Spatially Flexible Optical Networks"
- > June 27th 2017, CISCO Live, Las Vegas, "Network Slicing SDN Controller"
- > May 30th 2017, Terena Networking Conference, Linz, "Application-centric multi-layer transport networking"
- > February 22th 2017, CISCO Live, Berlin, "OVPN SDN Controller"
- > July 13th 2016, ICTON 2016, Trento, "Resource allocation in the 5G-crosshaul"
- > June 27th 2016, EuCNC - Workshop on Next Generation fronthaul/backhaul integrated transport networks, Athens, "Bringing Application-awareness into Future Transport Networks: the ACINO approach"
- > May 26th 2016, Politecnico di Milano, CommTech Talks (seminar series) "Application-* networking: a road paved with opportunities"
- > November 10th 2015, 12th Conference of Telecommunication, Media and Internet Techno-Economics (CTTE) - COMBO Workshop, Munich, "Resource Management in 5G Transport Networks"
- > June 30th 2015, OSA Advanced Photonics Congress (Photonic Networks and Devices), Boston, "Control and Orchestration for Future IP/Optical Transport Networks"
- > June 23th 2014, EuCNC - Workshop on Spatially or/and Spectrally Flexible Core Optical Networks, Bologna, "Control plane for spatially/spectrally flexible optical networks: a preliminary investigation"
- > June 7th 2014, ICTON, Graz, "Proactive restoration of slow-failures in optical networks"
- > June 3rd 2014, NoC, Milan, "Some preliminary thoughts on SDN-based optical access networks"
- > July 3rd 2012, ICTON, Coventry, "A control plane framework for future cognitive heterogeneous optical networks"

Tutoring and Supervision Activities

Domenico has been responsible for tutoring and coordinating the research activities of graduate researchers, post-doc researchers and research engineers, first as technical group leader and then as project manager and head of unit.

In particular, he has been Advisor of 2 PhD Students, co-Advisor of 2 PhD students, and co-Advisor of more than 10 MSc students of the University of Trento, Politecnico di Milano and University of Bologna.

In 2018 he has been appointed as External Referee of a PhD thesis from Politecnico di Torino.

Other Certifications and Training Activities

2010	BONE Master School 2010, BME Budapest University of Technology and Economics, Budapest Topic: Photonics in Switching
2009	Italian professional qualification as Telecommunication Engineer
2009	BONE Master School 2009, AGH University of Science and Technology, Krakow Topic: Optical Core Networks
2004 - 2006	Cisco Certified Network Associate CCNA 1 (Networking Basics), 2 (Routers and Routing Basics), 3 (Switching Basics and Intermediate Routing), 4 (WAN Technologies)
2002	Winner of VERIZON Scholarship for Telecommunications Engineering Students

Languages

Italian ●●●●●
English ●●●●○

Strengths

- > Leadership
- > Motivation
- > Autonomy

Publications

Here follows the list of Domenico Siracusa's academic publications in peer-reviewed journals and international conferences up to December 2017.

Journal Papers

- [1] F. Pederzoli, D. Siracusa, B. Shariati, J. M. Rivas-Moscoco, E. Salvadori, and I. Tomkos, "Improving performance of spatially joint-switched space division multiplexing optical networks via spatial group sharing," *JOURNAL OF OPTICAL COMMUNICATIONS AND NETWORKING*, vol. 9, no. 3, pp. 1–12, 2017.
- [2] V. Lopez, D. Klonidis, D. Siracusa, C. Rozic, I. Tomkos, and J. P. Fernandez-Palacios, "On the benefits of multilayer optimization and application awareness," *JOURNAL OF LIGHTWAVE TECHNOLOGY*, vol. 35, pp. 1274–1279, 2017.
- [3] F. Pederzoli, M. Gerola, A. Zanardi, X. Forns, J. F. Ferran, and D. Siracusa, "Yamato: The first sdn control plane for independent, joint, and fractional-joint switched sdm optical networks," *JOURNAL OF LIGHTWAVE TECHNOLOGY*, vol. 35, pp. 1335–1341, 2017.
- [4] P. S. Khodashenas, J. M. Rivas-Moscoco, D. Siracusa, F. Pederzoli, B. Shariati, D. Klonidis, E. Salvadori, and I. Tomkos, "Comparison of spectral and spatial super-channel allocation schemes for sdm networks," *JOURNAL OF LIGHTWAVE TECHNOLOGY*, vol. 34, pp. 2710–2716, 2016.
- [5] R. J. Durán, N. Fernández, D. Siracusa, A. Francescon, I. de Miguel, I. Rodríguez, J. C. Aguado, E. Salvadori, and R. M. Lorenzo, "Experimental assessment of a cognitive mechanism to reduce the impact of outdated teds in optical networks," *PHOTONIC NETWORK COMMUNICATIONS*, vol. 31, pp. 259–271, 2016.
- [6] R. Borkowski, R. J. Durán, C. Kachris, D. Siracusa, A. Caballero, N. Fernández, D. Klonidis, A. Francescon, T. Jiménez, J. C. Aguado, I. de Miguel, E. Salvadori, I. Tomkos, R. M. Lorenzo, and I. Tafur Monroy, "Cognitive optical network testbed: Eu project chron," *JOURNAL OF OPTICAL COMMUNICATIONS AND NETWORKING*, vol. 7, pp. 344–355, 2015.
- [7] F. Pederzoli, D. Siracusa, E. Salvadori, and R. Lo Cigno, "Energy saving through traffic profiling in self-optimizing optical networks," *IEEE SYSTEMS JOURNAL*, 2015.
- [8] D. Klonidis, F. Cugini, O. Gerstel, M. Jinno, V. Lopez, E. Palkopoulou, M. Sekiya, D. Siracusa, G. Thouenon, and C. Betoule, "Spectrally and spatially flexible optical network planning and operations," *IEEE COMMUNICATIONS MAGAZINE*, vol. 53, pp. 69–78, 2015.
- [9] N. Fernandèz, R. J. Durán, D. Siracusa, A. Francescon, I. De Miguel, E. Salvadori, J. C. Aguado, and R. M. Lorenzo, "Virtual topology reconfiguration in optical networks by means of cognition: Evaluation and experimental validation," *JOURNAL OF OPTICAL COMMUNICATIONS AND NETWORKING*, vol. 7, pp. 162–173, 2015.
- [10] A. Caballero, R. Borkowski, I. De Miguel, R. J. Durán, J. C. Aguado, N. Fernandez, T. Jimènez, I. Rodriguez, D. Sànchez, R. M. Lorenzo, D. Klonidis, E. Palkopoulou, N. P. Diamantopoulos, I. Tomkos, D. Siracusa, A. Francescon, E. Salvadori, Y. Ye, J. López Vizcaíno, F. Pittalà, A. Tymecki, and I. Tafur Monroy, "Cognitive, heterogeneous and reconfigurable optical networks: The chron project," *JOURNAL OF LIGHTWAVE TECHNOLOGY*, vol. 32, pp. 2308–2323, 2014.
- [11] G. Rizzelli, D. Siracusa, G. Maier, G. Magarini, A. Mehmood, and M. Melloni, "Optical backplane based on ring-resonators: Scalability and performance analysis for 10 gb/s ook-nrz," *PHOTONICS*, vol. 1, pp. 131–145, 2014.
- [12] A. Pagès, A. Buttaroni, G. Maier, D. Siracusa, J. Perello, and S. Spadaro, "Techniques and benefits of energy-aware load-distribution in multi-domain translucent wavelength switched optical networks," *JOURNAL OF NETWORK AND SYSTEMS MANAGEMENT*, vol. 22, pp. 462–487, 2014.
- [13] I. De Miguel, R. Durán, T. Jimenez, N. Fernández, J. Aguado, R. Lorenzo, A. Caballero, I. Monroy, Y. Ye, A. Tymecki, I. Tomkos, M. Angelou, D. Klonidis, A. Francescon, D. Siracusa, and E. Salvadori, "Cognitive dynamic optical networks [invited]," *JOURNAL OF OPTICAL COMMUNICATIONS AND NETWORKING*, vol. 5, no. 10, 2013.

- [14] E. Salvadori, V. Chava, A. Zanardi, D. Siracusa, G. Galimberti, A. Tanzi, G. Martinelli, and O. Gerstel, "Distributed optical control plane for dynamic lightpath establishment in translucent optical networks based on reachability graph," *OPTICAL SWITCHING AND NETWORKING*, vol. 10, no. 1, pp. 3–15, 2013.
- [15] D. Siracusa, S. Grita, G. Maier, A. Pattavina, F. Paolucci, F. Cugini, and P. Castoldi, "Domain sequence protocol (dsp) for pce-based multi-domain traffic engineering," *JOURNAL OF OPTICAL COMMUNICATIONS AND NETWORKING*, vol. 4, no. 11, pp. 876–884, 2012.

Conference Papers

- [1] C. Rozic, M. Savi, C. Matrakidis, D. Klonidis, D. Siracusa, and I. Tomkos, "A framework for dynamic multi-layer resource allocation in application-centric networking," in *Proceedings of 2017 Optical Fiber Communication Conference (OFC 2017)*, 2017.
- [2] M. Savi, F. Pederzoli, and D. Siracusa, "An application-aware multi-layer service provisioning algorithm based on auxiliary graphs," in *Proceedings of 2017 Optical Fiber Communication Conference (OFC 2017)*, 2017.
- [3] A. Marsico, R. Doriguzzi-Corin, and D. Siracusa, "An effective swapping mechanism to overcome the memory limitation of sdn devices," in *Proceedings IFIP/IEEE Symposium on Integrated Network and Service Management (IM)*, 2017.
- [4] A. Marsico, M. Santuari, M. Savi, D. Siracusa, A. Ghafoor, S. Junique, and P. Skoldstrom, "An interactive intent-based negotiation scheme for application-centric networks," in *Proceedings IEEE Conference on Network Softwarization (NetSoft)*, 2017.
- [5] C. Rozic, M. Savi, C. Matrakidis, D. Klonidis, D. Siracusa, and I. Tomkos, "Application-centric dynamic multi-layer resource allocation in availability-aware sdn-orchestrated networks," in *Proceedings 2017 European Conference on Optical Communication (ECOC 2017)*, 2017.
- [6] R. Doriguzzi-Corin, S. Scott-Hayward, D. Siracusa, and E. Salvadori, "Application-centric provisioning of virtual security network functions," in *Proceedings IEEE International Workshop on Security in NFV-SDN (SN-2017)*, 2017.
- [7] M. Savi, C. Rozic, C. Matrakidis, D. Klonidis, D. Siracusa, and I. Tomkos, "Benefits of multi-layer application-aware resource allocation and optimization," in *Proceedings European Conference on Networks and Communications (EuCNC)*, 2017.
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