17th IEEE International Conference on Smart Technologies
IEEE EUROCON 2017
6–8 July 2017, Ohrid, Macedonia

FINAL PROGRAMME

Organized by:

IEEE Advancing Technology for Humanity
region IEEE 8
IEEE Republic of Macedonia Section

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17th IEEE International Conference on Smart Technologies
IEEE EUROCON 2017
6–8 July 2017, Ohrid, Macedonia

Editors:
Ljupco Karadzinov
Goga Cvetkovski
Pero Latkoski

http://eurocon2017.org/
June 2017

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Welcome to IEEE EUROCON 2017

Dear conference participants,

It is with great pleasure to welcome you at the 17-th IEEE International Conference on Smart Technologies EUROCON 2017. This conference is organized by one of the 10 geographical units of IEEE, and is at the same rank as major conferences organized by the IEEE Societies as IEEE technical organizational units. EUROCON is a flagship event of the IEEE Region 8 (Europe, Middle East and Africa) held every two years in a different country with participants from all over the world. It is a major international forum for the exchange of ideas, theory basics, design methodologies, techniques and experimental results between academia, research institutions and practitioners from industry. It has achieved a considerable success during the past 16 editions in all fields of electrical and electronic engineering, ICT and computer science covered by IEEE Societies.

The technical program includes plenary sessions with 7 invited keynote lectures, 15 regular technical track sessions, 4 special sessions (SS) on highly specialized topics reporting technical trends and breakthroughs within the scope of the conference, 7 special thematic areas (STA) with several special sessions, poster session, 4 panel discussions (PD), 2 workshops and a tutorial. The 48 techincal sessions are grouped in four tracks:

- Information and Communication Technologies,
- Circuits, Systems and Signal Processing,
- Power Engineering and Energy,
- Industrial and Consumer Applications.

The conference received 233 research papers submissions and after the rigorous peer review, only 172 papers have been accepted for presentation at the conference sessions. It is our special privilege and honor that this year the conference will be opened by our Honorary Chairs, the 2017 IEEE President Karen Bartleson and 2017-2018 IEEE R8 Director Margaretha Eriksson. The conference also includes a student competition with the EUROCON 2017 Best Student Paper Award, IEEE Region 8 Best Student Paper Contest 2017 presentations and awards, as well as presentations from IEEE Young Professionals (YP) and IEEE Professional Activities (PA) affinity groups.

The Conference this year will be held at the Metropol Lake Resort, located about 7 km south from the magnificent city of Ohrid. It is referred to as the "Jerusalem of the Balkans" due to its richness in churches, picturesque sites and monuments, while the Ohrid Lake, as the oldest in Europe, has unique flora and fauna with more than 200 endemic species. Both, the city and the lake, are protected as UNESCO Cultural and Natural World Heritage and are regarded as one of the best summer destinations.

In the name of the organizing committee and myself, I would like to thank to all sponsors for the support to the conference and particularly to the Saints Cyril and Methodius University, Skopje, Macedonia and all the colleagues form the Faculty of Electrical Engineering and IT, and Faculty of Computer Science and Engineering, as well as all the members of the Ex Com of the IEEE Republic of Macedonia Section which celebrates it 20-th anniversary this year. Also, special thanks to our major sponsors, the Neotel and Netcetera companies.

A conference is not just a collection of paper presentations and attending technical sessions. It is an occasion on which people with common interest come together and confer, establish further cooperation, make new contacts and life long friendships. On behalf of the organizing committee, I wish your days at the IEEE EUROCON 2017 to be very productive and enjoyable.

Prof. Dr. Ljupco Karadzinov,
IEEE EUROCON 2017 General Chair,
IEEE Republic of Macedonia Section Chair.

Conference Committees

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Conference Venue

The Conference will take place at Metropol Lake Resort near Ohrid.

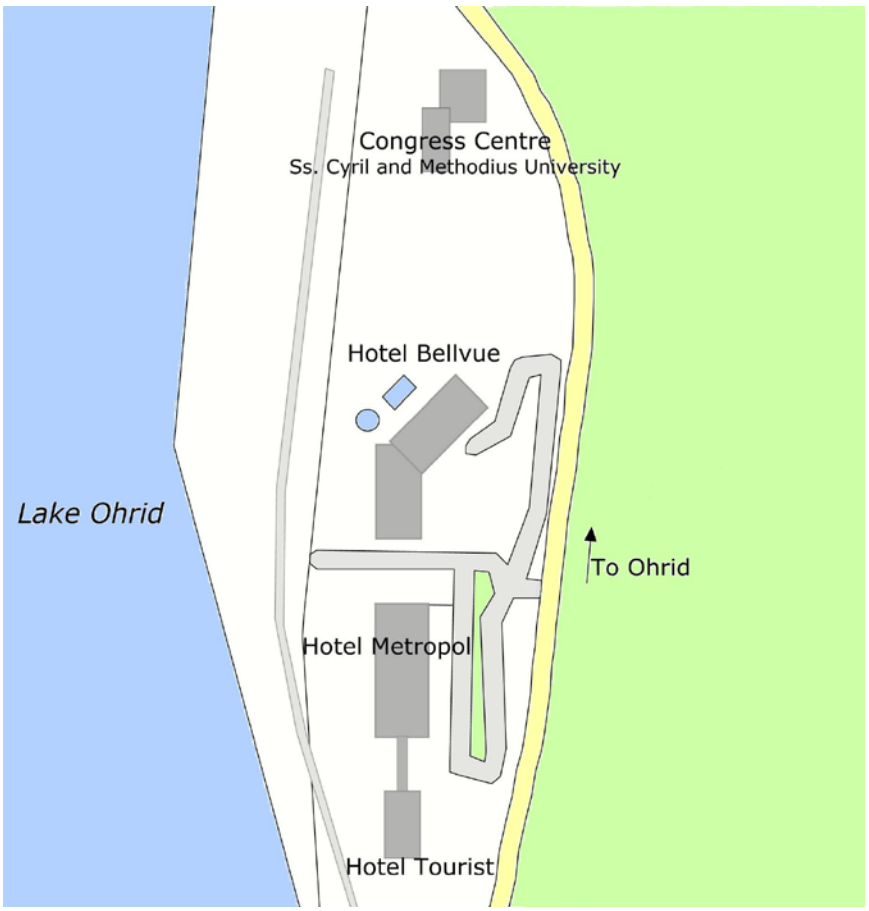
Accommodation is provided in the three hotels: Metropol, Bellevue and Turist.

Metropol Lake Resort

Hotel Metropol ****

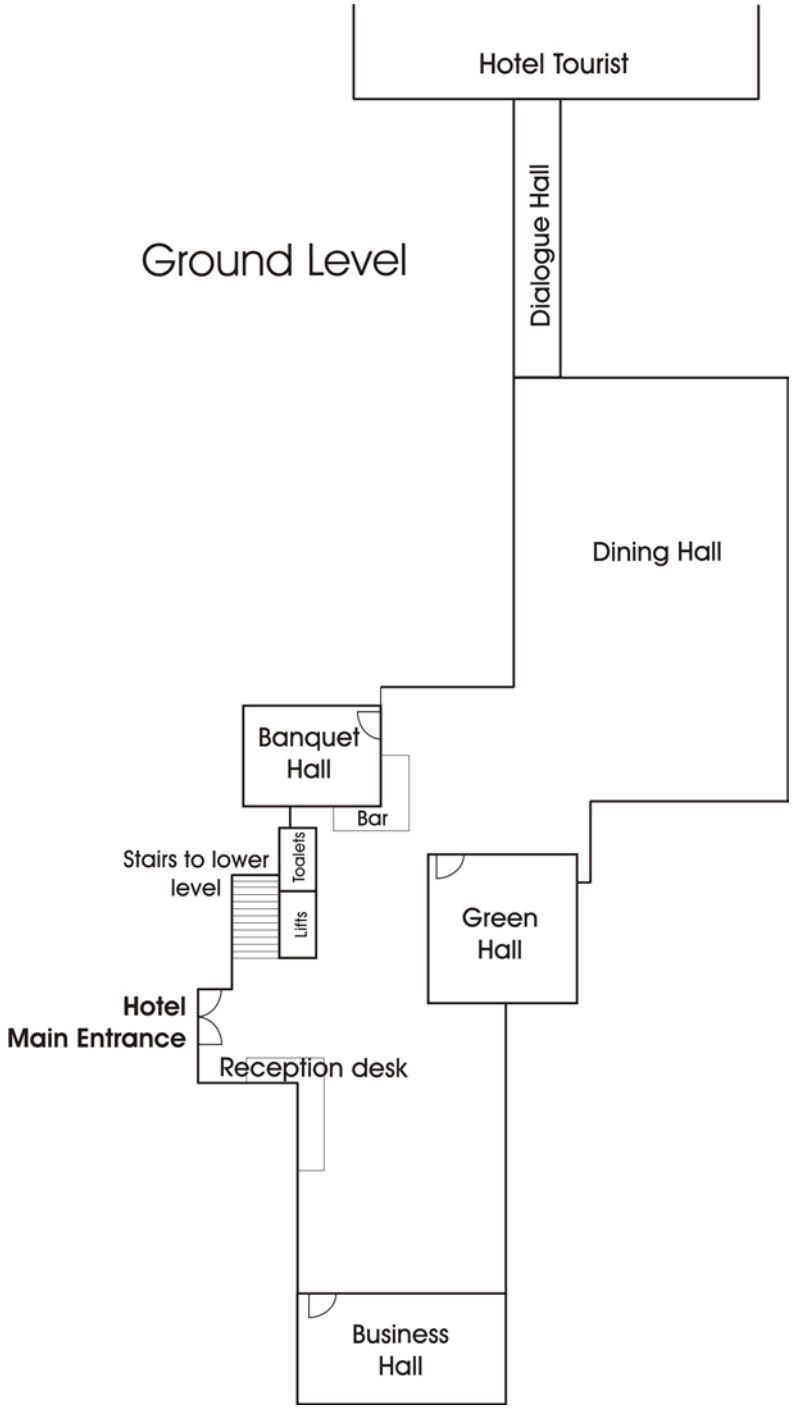
Hotel Bellevue ****

Hotel Tourist ***

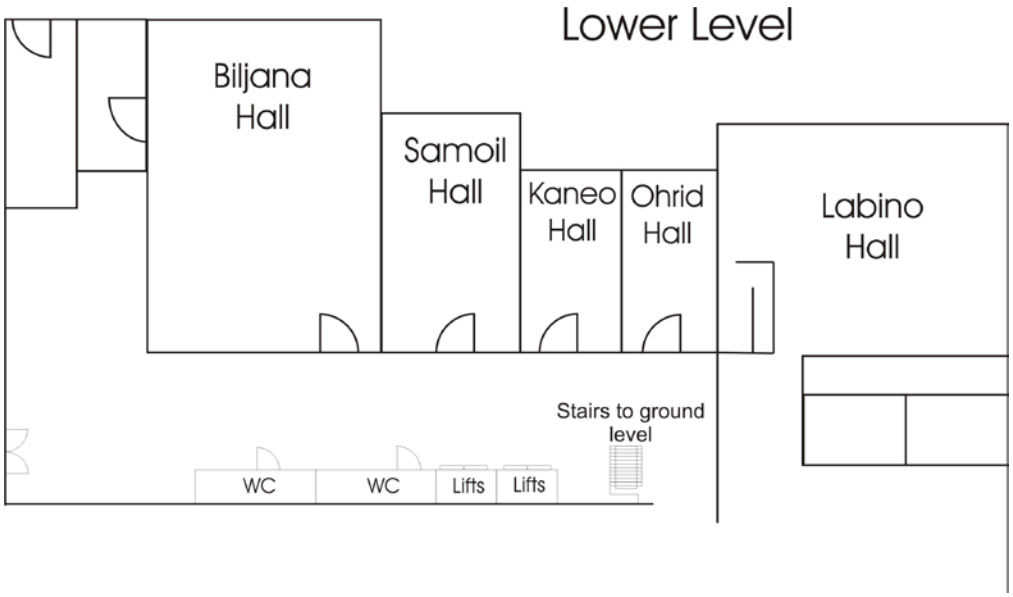


The three hotels comprising Metropol Lake Resort

Plan of Metropol Hotel: Ground Level –Reception



Plan of Metropol Hotel: Lower Level – Conference Rooms



Registration Desk

The Registration Desk will operate at:

Wednesday, 5. July	11:00 – 20:00	Bellevue Hotel
Thursday, 6. July	8:00 – 20:00	Metropoi Hotel
Friday, 7. July	8:00 – 20:00	Metropol Hotel
Saturday, 8. July	8:00 – 12:00	Metropol Hotel

Contact During the Conference

Registration Desk Phone Number: **+ 389 71 358 456** (Mr. Pero Latkoski)
+ 389 70 323 167 (Mr. Goga Cvetkovski)

Lunches and Coffee Breaks

Lunches will be served in the Metropol Hotel in the **Dining Hall**. They will be served on 6th and 7th July from 13:00 h until 14:30 h. The badges contain the lunch tickets. Lunch on the 8th July will be seved **on the boat** during the boat tour with visit to the Monastery of St. Naum and Bay of Bones.

Coffee breaks will be served on the **Lower Level Terrace** of Hotel Metropol.

IEEE EUROCON 2017 Conference Program

Time	Thursday, 6 July 2017					Friday, 7 July 2017						Saturday, 8 July 2017				
	Breakfast					Breakfast						Breakfast				
8:30 9:00 9:30						Track 2 CSSP	Track 3 PEE	STA2 IoT	STA12 Cloud & Big Data	SPC 2017 Special Session		Track 1 ICT	Track 2 CSSP	Track 3 PEE	Track 4 ICA	STA9/11 Smart Electrical Machines
10:00	Opening Ceremony + Plenary Keynote Lecture "Nanotechnology Enabled Pathways for Energy Conversion" by Prof. Stephen Goodnick					Coffee Break						Coffee Break				
10:30 11:00						Track 2 CSSP	Track 3 PEE	STA2 IoT	STA12 Cloud & Big Data	SPC 2017 Special Session		Track 1 ICT	STA1/6 5G Tech.	SS1 WAMPAC	STA9/11 Smart Drives and Control	IEEE YP Workshop: Impro-visional skills
11:30	Coffee Break															
12:00 12:45	Plenary Keynote Lecture "5G as an Enabler of New Energy, Transport, Production and other Verticals" by Prof. Petar Popovski					Plenary Keynote Lecture "Does DC Distribution Make Sense?" by Prof. Josep M. Guerrero						Plenary Keynote Lecture "5G Mobile Networks: Implications for Operators, Verticals and End Users" by Prof. Eckhard Grass				
12:45 13:30	Plenary Keynote Lecture "Data Science profession and education" by Prof. Yuri Demchenko					Plenary Keynote Lecture "Software Digital Waste Disposal" by Swiss Internet Ind. Assoc. President and Netcetera CEO Dr. Andrej Vckovski						Plenary Keynote Lecture "What does European Energy Turnover (Energiewende) Mean for Small countries" by Prof. Rafael Mihalič				
13:30	Lunch					Lunch						Closing Ceremony				
14:00												Boat Tour with Lunch and Visit to the Monastery of St. Naum and Bay of Bones				
14:30 15:00 15:30	Track 3 PEE	Track 2 CSSP	STA3 Bio	STA5 Complex Networks & Syst.	PD5 Open Source Software	Track 1 ICT	Track 3 PEE	SS4 Metrology & Measur.	SS5 Wireless Vehicular Comm.	Workshop Small Data Networking	Poster Session					
16:00	Coffee Break					Coffee Break										
16:30 17:00 17:30	Track 1 ICT	STA3 Bio	STA7 Hybrid Intelligent Systems	PD2 Nuclear Energy in Europe	Tutorial: IoT for Smart Buildings	Track 1 ICT	SS7 e-Infra-structure	SS4 Metrology & Measur.	PD 3 Syst.-of-Systems	PD1 5G the & IoT	Poster Session					
18:00																
19:00	Presentations: IEEE Young Professionals (YP), IEEE Professional Activities (PA)															
20:00 21:00	Welcome Reception + 20th Anniversary of the IEEE Republic of Macedonia Section					Gala Dinner + Awards Ceremony										
22:00												Ohrid by Night: Cocktail bar Hemingway				
23:00	YP informal meet up – City of Ohrid															

Social Events

Welcome Reception and 20th Anniversary of the IEEE Republic of Macedonia Section Celebration

The Conference Welcome Reception will take place on 6th July 2017 at 20:00 h in the **Biljana Hall and the terrace on the Lower Level in the Hotel Metropol** starting at 20 o'clock. At the beginning prof. Goce Arsov will give an overview of the historical facts about the evolution of the IEEE Republic of Macedonia Section. Afterwards the participants can enjoy the Welcome cocktail party on the lower level terrace of Metropol Hotel.

Gala Dinner

The Gala Dinner (included in full conference registartion fee) will take place at the **Bellevue Hotel Restaurant Hall** on Friday, July 7th 2017 at 20:00 h. Traditional Macedonian food will be served. During the event a local folk dance group Otex will perform traditional Macedonian dances. Afterwards a local band will perform some evergreen melodies from all over the world.

During the Gala Diner, the 2017 IEEE President Karen Bartleson will present IEEE Service Awards to distinguished members of the IEEE Rep. of Macedonia Section.

The IEEE R8 Director Margaretha Eriksson will award the winners of the IEEE Region 8 Best Student Paper Contest 2017.

Boat Tour with Lunch and Visit to the Monastery of St. Naum and Bay of Bones

The full conference registration includes boat tour on 8th July 2017. The cruise will start at 14:00 h after the closing ceremony. Once we board the boat, lunch and drinks will be served. We will sail along the southern shoreline for about 2 hours with a tourist guide. During the cruise we can enjoy in the scenic view of Ohrid coastline and fisherman villages. Than the trip will continue to the St. Naum Monastery. The Monastery complex is surrounded by beautiful nature. Nearby are the springs of the river Crni Drim that leaves the Ohrid Lake at the city of Struga. Boat t

The foundations of the church of St. Naum date from the 10th century. St. Naum was a student of Ss. Cyril and Methodius who came back to Ohrid to spread Christianity. He was also known as a local monk who healed people. The tomb of St. Naum is in the church, in a special chamber, decorated with fresco paintings that illustrate his miracles. It is believed that if someone lays their head on the tomb, they will be able to hear his heartbeat.

During the stay participant can rent a small boat ("kajtche") tour along the springs of the river Crni Drim (optional). Afterwards, the visitors will return back to the hotel Metropol. Along the way the boat will stop at the Bay of Bones (a museum on water and archaeological site), an extraordinary underwater archaeological attraction (entrance tickets paid by the organizer).

Ohrid by Night: Cocktail bar Hemingway

Bus transport will be organized to the Ohrid City centre on 8th July 2017 at 21:00 h for a group entertainment and party at the Cocktail bar Hemingway. The return on your own schedule by taxi (approx. 3.5 EUR per car).

Accompanying Persons Programme

Ohrid City Tour (3 hours)

A transfer from the hotel to the city of Ohrid will be organised. The tour will start from Gorna Porta, and will follow by a visit to the Gallery of Icons and the church of St. Bogorodica Perivleptos dating from 1295, after which the sightseeing continues to the Ancient Theatre. Than the tour will continue towards the church of St. Kliment Ohridski at Plaosnik, named St. Pantelejmon, which has been recently fully renewed. From this place, visitors can enjoy the beautiful view of the Ohrid Lake and the surrounding area. Later the tour will continue with a visit to the church of St. Kaneo dating from the 14th century. A visit to the cathedral church of St. Sofia form the 11th century will follow. The tour will end at the city centre and the old Bazaar. Free time will be given for shooping (famous Ohrid Pearl, filigran jewellery, wood carving etc.)

Friday, 7th July 2017, 8:30–12:00, 14:30-17:30
Satudray, 8th July 2017, 8:30–12:00

Struga, Kalishta, Vevchani Tour (4,5 hours)

A transfer from the hotel to the city of Struga will be organised. After arriving in Struga the tour will start with a sightseeing of the city on foot starting with a visit of the place where the river Crni Drim is leaving the Ohrid Lake and starts it journey to the Adriatic Sea. The visitors will have the opportunity to take a short walk along the banks of the river Crni Drim and enjoy the architecture and atmosphere of Struga. Later the tour will continue by bus to Kalishta near the Albanian border, where the visitors will visit the Monastery dedicated to the Holy Mother. The tour will than continue to the village of Vevchani settled in the foot of the mountain Jablanica. Visitors will be able to enjoy the small waterfalls, springs and the beautiful nature. From here the visitors will be transferred by bus to the hotel Metropol.

Thursday, 6th July 2017, 14:30–19:00
Friday, 7th July 2017, 14:30–19:00

About Macedonia

500 BC 500 BC - Its recorded history began with the emergence of the ancient kingdom of Macedon in what is now the Greek part of Macedonia and the neighbouring Bitola district in the south of the present-day Republic of Macedonia.

358 BC By 358 BC, Philip had created a new Macedonian kingdom that was unified for the first time in its history, and he started it on a path of conquest that would bring it control of Greece and eventually much of the known world.

356 BC In this year Alexander III was born in Pella, capital at the time being. When Alexander the Great was 20 years old in 336 BC he came to power in Macedon, also known as Macedonia. Alexander became king after his father, Philip II, was assassinated.

148 BC Macedonia remained an important and powerful kingdom until it was annexed by the Romans in 148 BC. The region remained under Roman rule for centuries, a part of many provinces with various names.

51 AD In 51 AD for the first time on European soil, in the Macedonian towns Philippi, Thessalonica and Beroea, the Apostle Paul preached Christianity.

300 AD Macedonia eventually became part of the Byzantine empire around 300 AD. It wouldn't be too much longer until Slavs entered the region around the end of the 6th century, At the same time Christianity expanded in Roman Macedonia.

600 AD The Slavic tribes entered the Balkan Peninsula.

863 AD In this year the brothers St. Cyril and St. Methodius invented the alphabet named 'glagolica', which later became known as Cyrillic alphabet.

893 AD In 893 AD, St. Clement of Ohrid became the first Macedonian-Slav archbishop. Today the Macedonian Orthodox Church continues the traditions of St. Clement's Archbishopric of Ohrid. In the same year St. Clement built the monastery that he dedicated it to St. Pantelejmon, the protector of health. He also formed a Christian School with about 3500 students.

976 AD This was the year in which the Tzar Samuil established the mediaeval state known as the Macedonian Empire (976-1014).

1014 AD Tzar Samuil died after the defeat from the Byzantine army at the battle of Belasica, when 10.000 of the Macedonian solders were captured and blinded. For four centuries after the fall of the kingdom, rebellions and frequent changes of rule disrupted Macedonia's development.

1389 AD The Ottoman Turks have invaded Macedonia. The Turks firmly established themselves not only in Macedonia, but in all of the Southern Balkans. Ottoman rule will last for five centuries. .In the 18th century, under the pressure of the Greek Patriarch in Istanbul, the Turks abolished the Ohrid Archbishopric, which had been keeping alive the spiritual soul of the Macedonians for centuries since the times of Tsar Samuel.

1564 AD The first significant resistance movement against the Ottoman occupation was the Mariovo-Prilep Rebellion (1564 - 1565).

1689 AD The second significant resistance movement against the Ottoman was the Karposh Uprising in 1689.

1876 AD The second half of the nineteenth century was marked by the beginning of the national revolutionary struggle for the liberation of Macedonia. The Razlovtsi and Kresna Uprisings, in 1876 and 1878 respectively, had a strong influence on the growth of Macedonian national awareness.

1903 AD On August 2, 1903, VMRO launched the Ilinden Uprising against the Ottoman Turks and declared Macedonian independence. The revolutionaries liberated the town of Krushevo, and established the Republic of Krushevo with its own government. The uprising was brutally crushed by the Turks, but the Macedonian question thereafter aroused intense international concern.

1912 AD In 1912, Greece, Serbia, and Bulgaria joined forces and defeated the Turkish army in Macedonia. 100,000 Macedonians also participated and helped in the Turkish evacuation but the victors did not reward them. The Treaty of London (May 1913), which concluded the First Balkan War, left Bulgaria dissatisfied with the partition of Macedonia among the allies which resulted after the war.

1913 AD Bulgaria's attempt to enforce a new partition in a Second Balkan War failed, and the Treaty of Bucharest (August 1913) confirmed a pattern of boundaries that (with small variations) has remained in force ever since.

1914 AD In 1914, World War I erupted. Bulgaria sided with the Central powers and by 1915 it occupied the Serbian held part of Macedonia. But the defeat of the Central powers and the end of World War I in 1918 saw the partition of 1913 reconfirmed and Macedonia was left divided. At the Paris Peace Treaty, the demands of the Macedonians for independent and united Macedonia were ignored. Vardar Macedonia was re-incorporated with the rest of Serbia and into the new Kingdom of the Serbs, Croats, and Slovenes which was later renamed Yugoslavia.

1945 AD Following World War II, Yugoslavia was reconstituted as a federal state. When the former Vardar province was

established in 1944, most of its territory was transferred into a separate republic while the northernmost parts of the province remained with Serbia.

1991 AD On September 8, 1991, Macedonia declared its independence from federal Yugoslavia which was then in the process of breaking up after Slovenia and Croatia had opted for independence.

1995 AD Macedonia became a member of the UN.

About Ohrid

353 BC The name of the city of Ohrid up to the arrival of the Slavs was known as Lichnydos. This is the year in which for the firs time the name of Lichnydos appears in the documents of Philip II.

879 AD Is the year in which in official documents the name of the city appears to be Ohrid.

990 AD Between 990 and 1015, Ohrid was the capital and stronghold of the Samoil's medieval Macedonian state. From 990 to 1018 Ohrid was also the seat of the Ohrid Patriarchate. After the Byzantine conquest of the city in 1018, the Patriarchate was downgraded to an Archbishopric and placed under the authority of the Ecumenical Patriarch of Constantinople.

The medieval city of Ohrid has always been a significant cultural and economic centre, which encompasses and extraordinary combination of natural beauty and human art. Squeezed in the rocks on the north side of the lake, between the walls of preserves the secrets of many civilizations - the ancient (antique) theatre, the early Orthodox basilicas, numerous churches built between the 9thand the 14th century, more than 100 square meters fresco memoirs, a rich gallery of icons, manuscripts and other rarities.

At the end of the 9th century and the beginning of the 10th century, due to the activity of Saints Clement and Naum of Ohrid, Ohrid was the oldest cultural temple in the world of the Slavs. There, they created the first Slavic University much earlier than the Bologna University, which was the first source of the Slavic literacy and culture. Ohrid is credited as being the birthplace of the Cyrillic alphabet, which was most probably created by St. Clement of Ohrid that further reformed the Glagolic alphabet created in turn by the brothers St. Cyril and Methodius.

1083 AD Bohemond and his Norman army took the city in 1083. In the 13th and 14th century the city changed hands between Despotate of Epirus, Bulgaria, Byzantine Empire and Serbia.

As an episcopal city, Ohrid was an important cultural center. Almost all surviving churches were built by the Byzantines, the rest of them date back to the short time of Serbian rule during the late Middle Ages.

It is said that there used to be 365 churches in Ohrid - one for each day in the year. The fact that Ohrid had been an object of desire for many kings, archbishops, speaks for it self, challenging the curious ones to visit it to nowadays. The beautiful architecture of the 14thcentury in the old part of the city, with its narrow city streets creates a sense of unique harmony and beauty. Its beauty and virtuosity attracts the attention not only of tourists but of many experts as well. One special cultural monument of Ohrid is the old Bazaar - old shops rich with crafts products - filigrees, pearl, copper, pipes...

1389 AD At the end of the 14th century it was conquered by the Ottomans and remained under them until 1912. The Christian population declined during the first centuries of Ottoman rule. In 1664 there were only 142 Christian houses. The situation improved in the 18th century when Ohrid emerged as an important trade center on a major trade route. During the Ottoman period, the town was a part of the Monastir Sandzak, with a seat in Bitola.

1767 AD The Ohrid Archiepiscopate was forcefully abolished, and its eparchies attached to the Constantinople Patriarchate.

1913 AD After the Balkan Wars and the division of Macedonia (1912-1913), Ohrid became a city in the new Serbian kingdom.

1914 AD Later during the First world war (1914-1918), the line of Macedonian front was passing by the city.

1939 AD During the Second world war (1939-1945), Ohrid was under Bulgarian occupation.

1958 AD In this year The Macedonian Orthodox Church was re-established.

1980 AD In 1980, Ohrid and Lake Ohrid were accepted as a World Heritage Site by UNESCO.

Practical Information

Currency

The currency on Macedonia is denars (MKD) pronounced [denars]. In general, it is not possible to pay in Euros in shops or restaurants, although in some places they do accept payment with Euros. Foreign currencies can be very easily and safely changed in banks or exchange offices. The exchange rate, at the time this booklet is printed is 1 EUR = 61.50 MKD, and 1 USD=53.90 MKD.

Electricity

The electricity standard in Macedonia is 230 Volts AC, 50 Hz. For plugs and sockets, please consult the reception desk at your hotel.

Time

Macedonia belongs to the Central European Time (CET) zone. CET is 1 hour ahead of Greenwich Mean Time (GMT+1). During summer, due to daylight saving, time is shifted forward by one hour (GMT+2).

Telephones

The international access code to Macedonia is +389 and the prefix for Ohrid is (0)46 and for Skopje is (0)2. To dial an international number from Macedonia you need to precede your country code with 00 (double zero). There are three mobile phone providers: Telekom, OneVip and LycaMobile.

Common Phrases and Useful Words

English	Macedonian Translation - Latin Script	Macedonian Translation - Cyrillic Script
Good morning!	Dobro utro!	Добро утро!
Good afternoon!	Dobar den!	Добар ден!
Hello!	Zdravo!	Здраво!
What are you doing?	Sto pravis?	Што правиш?
How are you?	Kako si?	Како си?
I'm fine.	Dobro sum.	Добро сум.
Here you are.	Povelete.	Повелете.
How much does it cost?	Kolku chini?	Колку чини?
Thank you.	Blagodaram.	Благодарам.
Goodbye!	Prijatno!	Пријатно!
Cheers!	Na zdravje!	На здравје!
Excuse me/I'm sorry	Izvinete.	Извинете.
Yes	Da	Да
No	Ne	Не
One, two, three, four, five, six, seven, eight, nine, ten	Eden, dva, tri, chetiri, pet shest, sedum, osum, devet, deset	Еден, два, три, четири, пет, шест, седум, осум, девет, десет

Dining in Ohrid

Restaurants in Ohrid bring traditional Macedonian cuisine and culture. Restaurants in Ohrid also offer a large selection of international and national beer and a specially selected wine list with mouth watering gourmet dining. Enjoy a romantic sunset dinner along the beautiful transparent waters of Lake Ohrid.

For a nightcap and a more relaxed setting you can also visit the cafés which offer a variety of specialty coffees and European pastries. All cafés in Ohrid have an enclosed or outdoor section extending onto the Ohrid famous *charsija* or along the lake. All restaurants and cafes within walking distance or short cab ride away from each other.

Ohrid has a reputation for Great Food and Service at Reasonable Prices.

Cuisine and Wine

Macedonia has a long and praised tradition of culinary delights. Over the centuries, many civilizations have enjoyed the produce of its fertile soil. Having avoided negative influences of urbanization, Macedonia remains the agricultural heartland of the Balkans, filled with a wonderful variety of foodstuffs native to both Mediterranean and Central European climates. In fact, few countries as small as Macedonia can offer such a variety of products including everything from citrus fruits, grapes and hazelnuts to tobacco, rice and mountain teas.

In addition, Macedonia is also rich in meat, producing beef, chicken, pork and lamb, and a whole range of game. Macedonia's many lakes yield a variety of freshwater fish, most famous of all being Lake Ohrid Trout. As a dairy producer, Macedonia is especially well known for its cheeses: soft white cheese (*sirenje*), similar to Greek feta; yellow cheese (*kashkaval*), similar to Italian Locatello Romano; and also its yoghurt and milk. Every Macedonian village offers unique and tasty local varieties. Macedonia is also famous for its wines, produced by unusually high quality grapes, such as Vranec, classic Cabernet Sauvignon, and mellow Merlot. Today, several small boutique wineries in Macedonia produce delectable red and white wines comparable to any French, Italian or California vintages. Besides its wines, Macedonian vintners produce fiery brandy - *rakija* and *mastika*. Products of Macedonia breweries are enthusiastically guzzled by tourists and locals alike. Traditional Macedonian cuisine combines Balkan and Mediterranean characteristics, inherited largely from Turkish tastes that prevailed during long centuries of Ottoman rule. Some specialties, such as *taratur* (sour yogurt with bits of cucumber), *pindzur* (cream salad with peppers and eggplant) and the world-famous baklava are characteristic of Balkan cuisine in general. Other Turkish-influenced dishes include grilled beef kabobs and the omnipresent *burek*, a flaky sort of pie filled with ham, cheese, spinach, ground beef and combinations thereof. Macedonian dishes like *tavche gravche* (baked beans), *shopska salata* (a salad made of sliced tomato, cucumber and onion, topped with ground soft white cheese), *selsko meso* (pork chops and champignon mushrooms in a rich brown gravy), *pastrmajlij*a (a sort of pizza topped with meat and sometimes egg) and, above all, *ajvar* (the national sauce, made from sweet red peppers).

Shopping in Ohrid

Most popular items to buy in Ohrid are traditional Macedonian musical instruments, filigree jewellery, woodcarvings, items made from copper, or a CD with authentic Macedonian music, can be brought home to refresh your memories of your visit. The Talevi and Filevi are two Ohrid families who make genuine Ohrid pearl necklaces, earrings and broaches; they carried over this handcraft down from one generation to another. Ohrid pearl is created from the fish called Plasica.

TECHNICAL PROGRAMME

IEEE EUROCON 2017 Conference Program

Time	Thursday, 6 July 2017					Friday, 7 July 2017						Saturday, 8 July 2017				
	Breakfast					Breakfast						Breakfast				
8:30 9:00 9:30						Track 2 CSSP	Track 3 PEE	STA2 IoT	STA12 Cloud & Big Data	SPC 2017 Special Session		Track 1 ICT	Track 2 CSSP	Track 3 PEE	Track 4 ICA	STA9/11 Smart Electrical Machines
10:00	Opening Ceremony + Plenary Keynote Lecture "Nanotechnology Enabled Pathways for Energy Conversion" by Prof. Stephen Goodnick					Coffee Break						Coffee Break				
10:30 11:00						Track 2 CSSP	Track 3 PEE	STA2 IoT	STA12 Cloud & Big Data	SPC 2017 Special Session		Track 1 ICT	STA1/6 5G Tech.	SS1 WAMPAC	STA9/11 Smart Drives and Control	IEEE YP Workshop: Impro-visional skills
11:30	Coffee Break															
12:00 12:45	Plenary Keynote Lecture "5G as an Enabler of New Energy, Transport, Production and other Verticals" by Prof. Petar Popovski					Plenary Keynote Lecture "Does DC Distribution Make Sense?" by Prof. Josep M. Guerrero						Plenary Keynote Lecture "5G Mobile Networks: Implications for Operators, Verticals and End Users" by Prof. Eckhard Grass				
12:45 13:30	Plenary Keynote Lecture "Data Science profession and education" by Prof. Yuri Demchenko					Plenary Keynote Lecture "Software Digital Waste Disposal" by Swiss Internet Ind. Assoc. President and Netcetera CEO Dr. Andrej Vckovski						Plenary Keynote Lecture "What does European Energy Turnover (Energiewende) Mean for Small countries" by Prof. Rafael Mihalič				
13:30	Lunch					Lunch						Closing Ceremony				
14:00												Boat Tour with Lunch and Visit to the Monastery of St. Naum and Bay of Bones				
14:30 15:00 15:30	Track 3 PEE	Track 2 CSSP	STA3 Bio	STA5 Complex Networks & Syst.	PD5 Open Source Software	Track 1 ICT	Track 3 PEE	SS4 Metrology & Measur.	SS5 Wireless Vehicular Comm.	Workshop Small Data Networking	Poster Session					
16:00	Coffee Break					Coffee Break										
16:30 17:00 17:30	Track 1 ICT	STA3 Bio	STA7 Hybrid Intelligent Systems	PD2 Nuclear Energy in Europe	Tutorial: IoT for Smart Buildings	Track 1 ICT	SS7 e-Infra-structure	SS4 Metrology & Measur.	PD 3 Syst.-of-Systems	PD1 5G the & IoT	Poster Session					
18:00																
19:00	Presentations: IEEE Young Professionals (YP), IEEE Professional Activities (PA)															
20:00 21:00	Welcome Reception + 20th Anniversary of the IEEE Republic of Macedonia Section					Gala Dinner + Awards Ceremony										
22:00												Ohrid by Night: Cocktail bar Hemingway				
23:00	YP informal meet up – City of Ohrid															

General Conference Programme Timetable

Thursday, July 6th	
10:00-10:45	Session 1: Opening Ceremony
10:45-11:30	Session 2: Plenary Keynote Lecture 1 _ Stephen Goodnick - Nanotechnology Enabled Pathways for Energy Conversion
11:30-12:00	Coffee Break
12:00-12:45	Session 3: Plenary Keynote Lecture 2 _ Petar Popovski - Wireless Communication Challenges in 5G towards Transforming Vertical Industries
12:45-13:30	Session 4: Plenary Keynote Lecture 3 _ Yuri Demchenko - Data Science Profession and Education
13:30-14:30	Lunch Break
14:30-16:00	Session 5A: Track 2_1 - Circuits, Systems and Signal Processing
14:30-16:00	Session 5B: Track 3_1 - Power Engineering and Energy
14:30-16:00	Session 5C: STA 3_1 - Bioelectromagnetic Medicine and Bioinformatics
14:30-16:00	Session 5D: STA 5 - Complex Networks and System
14:30-16:00	Session 5E: PD 5 - Open Source Software
16:00-16:30	Coffee Break
16:30-18:00	Session 6A: Track 1_1 - Information, Communication and Technology
16:30-18:00	Session 6B: STA 3_2 - Bioelectromagnetic Medicine and Bioinformatics
16:30-18:00	Session 6C: STA 7 - Hybrid Intelligent Systems
16:30-18:00	Session 6D: PD 2 - Nuclear Energy in Europe
16:30-18:00	Session 6E: Tutorial - Internet of Things for Smart Buildings - Current and Future Trends
19:00-20:00	Session 7: IEEE Young Professionals and IEEE Professional Activities
20:00-23:00	Session 8: Plenary Lecture - Goce Arsov – IEEE Republic of Macedonia Section - 20 Years Devoted to the Benefit of the Profession

Friday, July 7th	
08:30-10:00	Session 9A: Track 3_2 - Power Engineering and Energy
08:30-10:00	Session 9B: STA 2_1 - The Future of Smart Technologies and Intelligent Infrastructures
08:30-10:00	Session 9C: SPC 2017
08:30-10:00	Session 9D: STA 12_1 - Cloud Based Infrastructure and Platforms for Big Data
08:30-10:00	Session 9E: Track 2_2 - Circuits, Systems and Signal Processing
10:00-10:30	Coffee Break
10:30-12:00	Session 10A: STA 12_2 - Cloud Based Infrastructure and Platforms for Big Data
10:30-12:15	Session 10B: Track 2_3 - Circuits, Systems and Signal Processing
10:30-12:00	Session 10C: Track 3_3 - Power Engineering and Energy
10:30-12:00	Session 10D: STA 2_2 - The Future of Smart Technologies and Intelligent Infrastructures
10:30-12:00	Session 10E: SPC 2017
12:00-12:45	Session 11: Plenary Keynote Lecture 4 - Josep M. Guerrero - Does DC Distribution Make Sense?
12:45-13:30	Session 12: Plenary Keynote Lecture 5-Andrej Vckovski-Software Digital Waste Disposal
13:30-14:30	Lunch Break
14:30-16:00	Session 13A: Track 1_2 - Information, Communication and Technology
14:30-16:00	Session 13B: Track 3_4 - Power Engineering and Energy
14:30-16:00	Session 13C: SS 4_1 - Trends in Metrology and Innovative Measurement Techniques
14:30-16:00	Session 13D: Workshop - Small Data Networking
14:30-16:00	Session 13E: Poster Session
16:00-16:30	Coffee Break
16:30-18:00	Session 14A: Track 1_3 - Information, Communication and Technology
16:30-18:00	Session 14B: SS 4_2 - Trends in Metrology and Innovative Measurement Techniques
16:30-18:00	Session 14C: SS 5 - Applications, Demands and Requirements of Future Wireless Vehicular Communication
16:30-18:15	Session 14D: SS 7 - e-Infrastructure for Scientific Excellence
16:30-18:00	Session 14E: PD 3 - Systems-of-Systems, Smart Things or Complex Systems?
16:30-18:00	Session 14F: Workshop - Small Data Networking and PD 1 - 5G and the IoT

Saturday, July 8th	
08:30-10:00	Session 15A: Track 1_4 - Information, Communication and Technology
08:30-10:00	Session 15B: Track 2_4 - Circuits, Systems and Signal Processing
08:30-10:00	Session 15C: Track 3_5 - Power Engineering and Energy
08:30-10:00	Session 15D: Track 4 - Industry and Consumer Applications
08:30-10:00	Session 15E: STA 9/11_1 - Smart Technologies in Electrical Machines and Drives
10:00-11:30	Coffee Break
10:30-12:00	Session 16A: Track 1_5 - Information, Communication and Technology
10:30-12:00	Session 16B: STA 1/6 - Disruptive Technology Directions for 5G and Ultra High Speed Wireless and Optical Technologies for 5G
10:30-12:00	Session 16C: SS 1 - WAMPAC - Towards Future Power Transmission System
10:30-12:00	Session 16D: STA 9/11_2 - Smart Technologies in Electrical Machines and Drives
10:30-12:00	Session 16E: IEEE Young Professionals Workshop: Improvisional Skills
12:00-12:45	Session 17: Plenary Keynote Lecture 6 - Eckhard Grass - 5G Mobile Networks: Implications for Operators, Verticals and End Users
12:45-13:30	Session 18: Plenary Keynote Lecture 7 - Rafael Mihalic - What does European Energy Turnover (Energiewende) Mean for Small Countries
12:45-13:30	Closing ceremony
14:00-18:00	Boat trip and Lunch Break

Conference Information

Opening Ceremony

The Opening Ceremony will take place on **6th July 2017 at 10:00 h in Biljana Hall on the Lower Level of the Hotel Metropol.** The conference will be declared open by the 2017 IEEE President Karen Bartleson. It also includes two presentations:

- 2017-2018 IEEE R8 Director Margaretha Eriksson about the IEEE and R8,
- 2017 IEEE President Karen Bartleson about IEEE future stategies.

Papers Presentations

Oral Sessions

Timing: Sessions schedule is given in the in the Conference Technical Programme. Oral paper presentations are allocated a time slot of 15 minutes, 10 – 12 minutes for the presentations, and 3 – 5 min. for questions and discussion. Please, limit your presentation to about 10–15 slides containing the most important achievements in you work. Session Chairs are should strictly enforce the time limits.

Format: Video projector as well as a laptop will be available in the conference rooms. Oral presentations should be prepared in Microsoft Power Point (*.ppt; *.pps) or Adobe Acrobat (*.pdf) format. The name of the Conference, place and date (IEEE EUROCON 2017, 6–8 JULY 2017, OHRID, R. MACEDONIA) should be clearly indicated at the bottom of each slide.

Presentation: Presenting authors can upload the presentations through the Easy Chair system, or at the conference at least 15 minutes before the session is scheduled. A conference staff and the session chair will be present in the room to receive and upload your file(s) and to provide the technical support if needed. Each presenter should "check-in" with the session chair 15 minutes before the session beginning to confirm his presence and check the correct name, title and affiliation.

Poster Sessions

Timing: Poster sessions are allocated in 180 minutes. Please arrive at least 15 minutes ahead of the scheduled poster session to arrange your poster and to check that all necessary supplies are present. You are kindly asked immediately after the session end to remove your poster from the board.

Format: Boards will be at your disposal in the poster area. Pins or tape will be provided by the conference organization.

Before the session begins, an assistant will place paper number – consisted of the Session number and your paper ID# on the top-left of the board. Prepare your poster as portrait into A0 format (width 84 cm and height 1190 cm). Your paper title and authors' names with their affiliation should be displayed prominently across the top of your poster. Use an appropriate font size, allowing a poster to be readable by delegates from a distance of 1.5 m. The name of the Conference, place and date should be clearly indicated on the top or at the bottom of the poster, such as “IEEE EUROCON 2017, 6–8 JULY 2017, OHRID, R. MACEDONIA”.

Presentation: During the session, at least one presenter from the list of authors should be present at the poster and discuss the content and results of the research with the chairman, delegates and visitors. Failure to present the poster will result your paper to be deemed as "not-presented". Session chairs will be responsible for determining which papers have been presented.

The dialogue sessions will take place at the **Hotel Metropol Lower Level Terrace**.

Plenary Speakers

Nanotechnology Enabled Pathways for Energy Conversion

Professor Stephen Goodnick, IEEE Fellow
Department of Electrical Engineering
Ira A. Fulton School of Engineering
Arizona State University, USA

Session	Plenary Keynote Lecture 1
Date	2017-07-06
Time	10:45-11:30
Room	Biljana Hall
Chairs	Dragica Vasileska
Title	Stephen Goodnick - Nanotechnology Enabled Pathways for Energy Conversion
	Outline: Nanostructured solar cells have multiple approaches by which they can improve photovoltaic performance through new physical approaches in order to reach thermodynamic limits of energy conversion, circumventing material limitations through bandgap engineered systems and providing new routes for low-cost fabrication by self-assembly or design of new materials. In the present talk, we focus on pathways to high efficiency solar cells and energy conversion using various approaches employing nanostructured materials. We first discuss the limits of conventional photovoltaics, and advanced concept approaches to exceed the so-called Shockley-Queisser limit for single bandgap cells. We then discuss particular approaches that are actively being investigated including Si heterojunction solar cells with carrier selective contacts, nanowire solar cells as active components of multi-junction solar cell, quantum dot solar cells for intermediate band devices, and multi-exciton generation for increasing the quantum yield above unity in quantum dot and nanowire structures. Hot carrier solar cells are another approach to high efficiency discussed, where the critical issue is reducing the energy loss rate of photoexcited carriers, either in low-dimensional nanostructured materials where this rate is reduced, or in phononic bandgap materials in which nonequilibrium phonons reduce carrier cooling, and allow extraction at high energy. Another way that nanomaterials improve efficiency which we discuss, is in improving light trapping of incident solar radiation, using nanowires and nanoparticles as scatterers in the diffraction limit, to increase absorption by increasing the optical path length in the device. Finally, we discuss hybrid high temperature multijunction photovoltaics coupled with concentrating solar thermal in order to improve the system efficiency above either that of the photovoltaic or CSP system by itself.

Wireless Communication Challenges in 5G towards Transforming Vertical Industries

Professor Petar Popovski, IEEE Fellow
Wireless Communications
Department of Electronic Systems
Aalborg University, Denmark

Session	Plenary Keynote Lecture 2
Date	2017-07-06
Time	12:00-12:45
Room	Biljana Hall
Chairs	Liljana Gavrilovska
Title	Petar Popovski - Wireless Communication Challenges in 5G towards Transforming Vertical Industries
	Outline: While the previous generations of mobile communications were focused on providing high rates and seamless connectivity for the user, 5G is poised to change the vertical industries, such as energy, transport, industrial production, and health. There is a common consensus that 5G will consists of three different modes: extended Mobile Broadband (eMBB), Machine-Type Communication (mMTC) and Ultra-Reliable Low-Latency Communication (URLLC). With mMTC, the vertical industries get access to data from massive amount of sensors and unprecedented insights in e.g. energy infrastructure or supply chain. URLLC represents one of the most innovative features of 5G, enabling mission-critical communications, such as reliable remote action with robots or coordination among vehicles. The value brought by URLLC can be understood as follows: Once a vertical industry can safely assume that wireless connectivity is “truly anywhere and anytime” and can be guaranteed e.g. >99.999% of the time, the approach to system design and operation changes fundamentally. This talk will introduce challenges faced by wireless communication on the path of creating 5G and transforming the current vertical industries into connected, fully digital verticals. It will present the fundamental tradeoffs that exist in designing the modes URLLC and mMTC, as well as architectures for supporting those services along with the extremely high rates offered by eMBB.

Data Science profession and education
Professor Yuri Demchenko
System and Network Engineering Research Group
University of Amsterdam, Netherlands

Session	Plenary Keynote Lecture 3
Date	2017-07-06
Time	12:45-13:30
Room	Biljana Hall
Chairs	Anastas Mishev
Title	Yuri Demchenko - Data Science Profession and Education

Outline:

Data Science is an emerging field of science, which requires a multi-disciplinary approach and has a strong link to Big Data and data driven technologies that create a strong transformational impact to all research and industry domains. Their sustainable development requires re-thinking and re-design of both traditional educational models and existing courses.

This talk will present a research and coordination activity done in the framework of the EU funded EDISON project to establish the new profession of Data Scientist for European research and industry. The EDISON project is specifically targeted to address issues of the data related skills and capacity building for European Open Science Cloud (EOSC) and European Digital Single Market (DSM), in particular targeting such issues as Data Stewardship, Research Data Management, research repeatability, and general data literacy.

The talk will provide overview of related research and activities to develop consistent and interoperable Data Science curricula that would empower the future graduates and professionals to build successful career paths as Data Scientist or other Data Science enabled professions. It will also refer to the Data Science champion universities community and related conference [3].

Does DC Distribution Make Sense?
Professor Josep M. Guerrero
Department of Energy Technology, Faculty of Engineering and Science
Aalborg University, Denmark

Session	Plenary Keynote Lecture 4
Date	2017-07-07
Time	12:00-12:45
Room	Biljana Hall
Chairs	Aleksandra Krkoleva
Title	Plenary Keynote Lecture 4 - Josep M. Guerrero - Does DC Distribution Make Sense?
Description	Josep M. Guerrero - Does DC Distribution Make Sense?
Outline	DC power systems bring in a possibility of easier and more efficient integration to any local renewable DC generation & energy storage when compared to alternating current (AC) systems. Moreover, there are neither phase unbalances nor harmonic and synchronization problems, leading to higher availability. These facts have induced a fast increase in the use of DC systems in residential, commercial and industrial systems. It will practically become a standard in data centers and telecom central offices. ICT equipment, lighting, consumer electronics, white goods, hybrid electric vehicles (HEV) all utilize DC voltage. However the market inertia and some technical barriers like protections limits its application. In this talk some projects including DC microgrids in applications such as: residential, charging stations, and shipboard power systems will be presented.

Software Digital Waste Disposal
Dr. Andrej Vckovski
President of the Swiss Internet Industry Association,
CEO and co-founder of Netcetera, Zürich, Switzerland

Session	Plenary Keynote Lecture 5
Date	2017-07-07
Time	12:45-13:30
Room	Biljana Hall
Chairs	Sonja Filiposka
Title	Andrej Vckovski - Software Digital Waste Disposal
Description	Andrej Vckovski - Software Digital Waste Disposal
	Outline: Current organizations in business and public administration are in a long-lasting process of digital transformation. New opportunities one the one side, a call for more efficiency and efficacy on the other side create an increasing demand for information systems in general. Every new system, however, generates additional system complexity if its operation does not dispose of legacy at the same time. Fields are not green anymore in most cases and therefore, the digital landscape of an organization already covered with many known and unknown elements of technology. This talk addresses awareness and strategy to cope with the increasing complexity within a system of systems based on practical examples of large-scale enterprise endeavours.

5G Mobile Networks: Implications for Operators, Verticals and End Users

Professor Eckhard Grass
Leader of Joint-Lab wireless broadband communication systems (IHP - HUB), IHP - Leibniz-Institut für innovative Mikroelektronik
and Humboldt-Universität zu Berlin, Germany

Session	Plenary Keynote Lecture 6
Date	2017-07-08
Time	12:00-12:45
Room	Biljana Hall
Chairs	Rolf Kraemer
Title	Eckhard Grass - 5G Mobile Networks: Implications for Operators, Verticals and End Users
Outline	Based on limitations and shortcomings of 4G, the main requirements for the 5th generation of mobile networks (5G) are outlined. The presentation highlights key architectural features, and target parameters of 5G. A summary of the key performance indicators (KPI) as targeted by the European 5G Infrastructure Public Private Partnership (5G-PPP) is given. Furthermore, the main concepts for reaching the targeted key performance indicators (KPI) are outlined. This includes small cells, network virtualization, software defined networks (SDN), Cloud Radio Access Networks (C-RAN). Some concepts, specifically investigated by the 5G-XHaul project, are discussed. In particular, the application of different splits of Physical- and MAC-layer functionalities in the network, the concept of transport classes as well as techniques for supporting network slicing are outlined. Moreover, technologies which are in the focus of current research, such as mmWave wireless systems, (massive-)MIMO and line-of-sight (LOS-)MIMO communications, passive and active fiber-optical systems and satellite links are highlighted. The potential of new modulation- and coding-schemes is briefly evaluated. For fiber optical communications, Time-Shared-Optical Networks (TSON) are a promising technology which will be briefly presented. Based on the reviewed concepts and technologies, some important implications for Mobile Network Operators (MNO) and their future business models are outlined. Additionally, some implications for big companies (OEM or 'verticals') on their activities are derived. Finally, the implications for the private end user are highlighted. In particular the performance, coverage, reliability and cost aspects will be elaborated on. Additionally, aspects such as security and privacy are visited. The roadmap for the development, evaluation and commercial deployment of the 5G technology according to the 5G-PPP initiative is presented. Further prospects of mobile communications systems, the required legal framework and future potential technologies will be highlighted.

What does European Energy Turnover (Energiewende) Mean for Small countries

Professor Rafael Mihalič
Department of Power Systems and Devices Head
Laboratory of electric power and supply chief
University of Ljubljana, Slovenia

Session	Plenary Keynote Lecture 7
Date	2017-07-08
Time	12:45-13:30
Room	Biljana Hall
Chairs	Goga Cvetkovski
Title	Rafael Mihalic - What does European Energy Turnover (Energiewende) Mean for Small Countries
Description	Rafael Mihalic - What does European Energy Turnover (Energiewende) Mean for Small Countries

Outline: When talking about development of human society, it should be stressed that from the early beginnings its demographic, economic and social development has been crucially dependent on human ability to harvest the energy from available energy sources (literally life or death alternative). This ability and the availability of energy sources have determined the course of human history. Accessibility of energy sources which do not require too much society's activity in general (which could nowadays be expressed also as a share of GDP spent for energy, sometimes expressed as EROI – Energy Returned on Investment) is a precondition for the development of higher society's activities (like supporting inactive members, education, healthcare, art, etc.). In other words, in order to develop a successful society a reasonable tendency is to take advantage of those energy sources that exhibit a sufficiently large ERoEI (Energy Received on Energy Invested). With this respect, an example from the USA can be very illustrative. When nation's expenditure for primary energy, as a share of GDP, raises to about ten percent (historically up to fourteen percent), recessions tend to occur. On the other hand, during conjuncture the costs for primary energy is about 5% of the GDP.

Up to this moment, European Union (EU) has spent about 1000 billion Euros to support the political decision of realizing the so-called *energy turnaround* (known as *Energievende*). New political commitments at the EU level have been adopted to abandon the so-called carbon fuels, replacing them with the *sustainable* ones. As a result, questions like “what this actually means with respect to ERoEI of energy supply in general” and “how does this reflect to economies of individual countries involved” tend to appear. How much has the EU population contributed to sustainability of the energy supply by spending the already mentioned billions of Euros? Do we have enough wealth and/or resources to replace at least a considerable share of current electricity production with renewables? What does the extensive transition to renewables mean for countries' competitiveness on global market? Some authors dealing with the subject argue that the main dilemma is not about applying the renewable energy sources or

	not. Instead, either economic growth or sustainable society's energy supply should be decided upon. Can the future of a country that decided for the sustainable alternative be foreseen if other countries do not follow the same pattern and consequently significantly overrun them in the economic sense? Does the society really gain by opening new jobs in the renewables industry while an individual coal-miner provides the society with 79 times more electricity as his colleague in the solar industry? The presented dilemmas should be among the top few crucial questions of the modern society. It would be naive to expect final answers to raised questions from the lecture. On the other hand, it is of utmost importance to encourage discussions on the topic, especially following the latest attempts to criminalize the scepticism of catastrophic scenarios and to categorize any comments about mistrusting "world saving" activities as a hate speech. A primary aim of the lecture is therefore to open such a debate, where statements made base on series of firm and verifiable physical facts.

Session	20th anniversary of the IEEE Republic of Macedonia Section
Date	2017-07-06
Time	20:00-23:00
Room	Biljana Hall
Chairs	Ljupco Karadzinov
Title	Goce Arsov _ IEEE Republic of Macedonia Section - 20 Years Devoted to the Benefit of the Profession
	Outline: This paper is dedicated to the 20th anniversary of the IEEE Republic of Macedonia Section, as part of one of the largest world professional organization. Beside the historical facts about the evolution of IEEE from AIEE and IRE and the meaning of its organization logo, and on the IEEE today, the paper concentrates on the history of the IEEE Republic of Macedonia Section. Firstly, an overview of friendly separation and birth of new sections in the former Yugoslavia region, as well as their current state is given. The formation process of the IEEE Republic of Macedonia Section has been described. Finally, the historical facts about the Section activities in the past 20 years devoted to the benefit of the profession, as well as its current status are presented.

Panel discussions, workshops and tutorials

Session	5E
Date	2017-07-06
Time	14:30-16:00
Room	Labino Hall
Chairs	Predrag Pejović and Branislav Gerazov
Title	PD 5 - Open Source Software
	Outline: The panel discussion will address issues in the application of free software in science and engineering, primarily in electrical engineering, covering the use of free operating systems, with emphasis on command line abstraction, text formatting, drawing schematics, visualizing data, scientific computing, computer algebra, general programming, and circuit simulation. The lecture would briefly cover free software as a social phenomenon, and would focus on various software tools: GNU/Linux operating systems, LaTeX, XCircuit, Asymptote, Zotero, GNU Octave, gnuplot, Scilab, wxMaxima, Python, NumPy, SciPy, Matplotlib, PyLab, SymPy, Pandas, SciKit-Image, SciKit-Learn, Theano, Tensorflow, Keras, Julia, Sage, Ngspice, KiCad, Qucs, Icarus Verilog, Verilator. The panel will feature 6 speakers that are actively using free software in their professional careers including Dusan Grujic, Aleksandar Pajkanovic, Nadica Miljkovic, and Josif Kjosev. They will present their experiences from using these tools in class, in their scientific research and professional practice. They will also address the difficulties involved in the transition to free software. The lecturers will also give concrete application examples ranging from creating presentations and educational animations, to control system design, virtual instrumentation and automated measurement and acquisition systems, circuit simulation, printed circuit board design, software applications in power electronics, processing of audio, speech, image, video and biomedical signals, machine learning, and deep learning.

Session	6D
Date	2017-07-06
Time	16:30-18:00
Room	Labino Hall
Chairs	Marko Čepin and Anton Čauševski
Title	PD 2 - Nuclear Energy in Europe

Session	6E
Date	2017-07-06
Time	16:30-18:00
Room	Ohrid Hall
Chairs	Muhammad Alam
Title	Tutorial - Internet of Things for Smart Buildings - Current and Future Trends

Muhammad Alam. Internet of Things for Smart Buildings - Current and Future Trends

The "Internet of things" (IoT) is becoming an increasingly growing topic and it is expected to offer advanced connectivity of devices, systems, and services that goes beyond machine-to-machine communications (M2M) and covers a variety of protocols, domains, and applications. Smart city is first and foremost a city – one that pushes the quality of resource management and service provision to the limit possible at the time. In such an integrated understanding of the smart city concept, smart city projects are part of a general concept of city modernization. Since the hype surrounding IoT is in the market, it is expected that exploiting IoT practices can play a key role in the development of sustainable future smart buildings that are energy efficient, flexible and equipped with advanced control systems to provide the best experiences for tenants. Therefore, the Internet of Things (IoT) is advancing a new breed of smart buildings that are better aligned with the priorities of property owners, managers and communities.

Session	13D
Date	2017-07-07
Time	14:30-16:00
Room	Biljana Hall
Chairs	Liljana Gavrilovska and Petar Popovski
Title	Workshop - Small Data Networking

#	Authors	Title	Speaker	Time
	Keynote Speaker: Alebrto Leon Garcia	Integrating IoT into Multi-tier Cloud Computing	Alebrto Leon Garcia	14:30-15:10
	Bane Vasic	Stochastic resonance in iterative decoders	Bane Vasic	15:10-15:35
	Liljana Gavrilovska	The Final Frontier for M2M Communication: Virtualization Case Study	Liljana Gavrilovska	15:35-16:00

#	Authors and Title
	Alberto Leon-Garcia. Integrating IoT into Multi-tier Cloud Computing

We consider a multitier computing cloud that comprises geographically-distributed massive scale core datacenters, smaller scale smart edge clusters, customer premise edge resources close to the user, and sensors and things, where a software-defined fabric connects this infrastructure, and where applications can be orchestrated end-to-end. In this talk we focus on providing a programmable and autonomic IoT platform based on microservices that can support big data as well as local and edge data processing. The autonomic management in the platform provides service availability, quality of service, and it optimizes resource utilization. We describe our testbed for investigating this IoT platform and using both hypervisor-based virtualization and container-based virtualization. We discuss several use cases and we present initial experimental results.

Session	14E
Date	2017-07-07
Time	16:30-18:00
Room	Biljana Hall
Chairs	Liljana Gavrilovska and Petar Popovski
Title	Workshop - Small Data Networking and PD 1 - 5G and the IoT

#	Authors	Title	Speaker	Time
	Cedomir Stefanovic	Coded slotted ALOHA with reliability and latency guarantees	Cedomir Stefanovic	16:30-16:55
	Federico Clazzer	How Combining Techniques Can Improve Asynchronous Random Access	Federico Clazzer	16:55-17:20
		PD 1 5G and the IoT		17:20-18:00

Session	14D
Date	2017-07-07
Time	16:30-18:00
Room	Samoil Hall
Chairs	Georgi Dimirovski, Yuanwei Jing and Xiaolong Qian
Title	PD 3 - Systems-of-Systems, Smart Things or Complex Systems?

#	Authors and Title
205	Plenary Lecture: Georgi M. Dimirovski. An Overview of Fascinating Ideas on Complexity, Complex Networks and Systems in Computational Cybernetics

This paper is focused on exploring the fascinating ideas about complexity in systems science conjunction with the synergies of control, communication and computing via a certain overview. By no means attempts are made to give final answers on what the control of complex systems may comprise. Rather it is an essay-like exposition of personal visions of complexity and controlled complex network and systems from the viewpoint of computational cybernetics. Though, it is also dedicated to explore the issues of integrated control and supervision within their possible interplay over complex plant processes. The justification for continuing the adventure of investigating controlled complex systems from a standpoint of physics and not solely mathematics is found to emerge by itself inevitably. It has been found, the cybernetic physics of complex networks and systems as well as their feasible controls is an open exploration road towards many unknowns. The analysis framework is based on the set-theoretic approach to systems science from the perspective of Lyapunov stability theory being employed.

Session	16E
Date	2017-07-08
Time	10:30-12:00
Room	Samoil Hall
Chairs	Jan Verveckken
Title	IEEE Young Professionals Workshop: Improvisional Skills

DETAILED PROGRAMME
AND
SESSIONS CHAIRS

IEEE EUROCON 2017 Detailed Programme

Thursday, July 6th		
10:00-10:45	Session 1: Opening Ceremony, Karen Bartleson, 2017 IEEE President and Margaretha Eriksson, IEEE R8 Director	
10:45-11:30	Session 2: Plenary Keynote Lecture 1 _ Stephen Goodnick - Nanotechnology Enabled Pathways for Energy Conversion	
11:30-12:00	Coffee Break	
12:00-12:45	Session 3: Plenary Keynote Lecture 2 _ Petar Popovski - Wireless Communication Challenges in 5G towards Transforming Vertical Industries	
12:45-13:30	Session 4: Plenary Keynote Lecture 3 _ Yuri Demchenko - Data Science Profession and Education	
13:30-14:30	Lunch Break	
14:30-16:00	Session 5A: Track 2_1 - Circuits, Systems and Signal Processing	
14:30-14:45	59	Maria-Alexandra Paun. Hall mobility study of Hall structures in two different CMOS technological processes
14:45-15:00	48	Abdul Rehman Javed, Prof. Dr.-Ing. Christoph Scheytt, Karthik Krishnegowda and Prof. Dr.-Ing. Rolf Kraemer. System Design of a Mixed Signal PSSS Transceiver using a Linear Ultra-Broadband Analog Correlator for the Receiver Baseband Designed in 130 nm SiGe BiCMOS Technology
15:00-15:15	45	Cosmin-Sorin Plesa, Cristian Raducan, Marius Neag and Bogdan Dimitriu. Novel Current Limit Circuitry for LDOs
15:15-15:30	39	Khaled Khalifa. Extendable Generic Base Verification Architecture for Flash Memory Controllers Based on UVM
15:30-15:45	21	Soenke Vehring, Yaoshun Ding, Dominic Maurath, Friedel Gerfers and Georg Boeck. Link-Budget Calculations for CMOS Integrated Microwave Receivers
14:30-16:00	Session 5B: Track 3_1 - Power Engineering and Energy	
14:30-14:45	108	Omid Shariati, Parisa Esmaili, Mohammad Reza Aghamohammadi and Abdullah Asuhaimi Bin Mohd Zin. Observability of Synchronous Generators' Parameters in its Dynamic Performance
14:45-15:00	176	Juraj Havelka, Goran Jurisic, Josip Tosic and Dora Mesic. Numerical Phasor Estimation Algorithms
15:00-15:15	148	Goga Cvetkovski and Lidija Petkovska. Multi-objective Optimal Design of PM Disc Motor Using Cuckoo Serach
15:15-15:30	129	Muhammed Akif Ülker and Bahri Uzunoglu. Simplex optimization for particle filter joint state and parameter estimation of dynamic power systems
15:30-15:45	99	Duško Lukač and Miljana Milić. Enhansing the Efficiency of Tracking PV System by Using ANN Based Prediction

14:30-16:00	Session 5C: STA 3_1 - Bioelectromagnetic Medicine and Bioinformatics	
14:30-14:45	134	Joanna Michalowska and Andrzej Krawczyk. Exposure to electromagnetic field in the surrounding area of microtomograph for the frequency of 50Hz
14:45-15:00	112	Agnieszka Michalczuk, Kamil Wereszczyński, Adam Świtoński, Henryk Josiński and Konrad Wojciechowski. The overview of automatically supported gait analysis methods for medical diagnoses and rehabilitation
15:00-15:15	49	Paolo di Barba, Maria Mognaschi and Andrzej Krawczyk. The biogeography-inspired optimization for the design of coils for nerve stimulation
15:15-15:30	34	Anna Koziorowska, Maria Romerowicz-Misielak, Natalia Gierczak, Sebastian Gniady and Marek Koziorowski. Electromagnetic field of extremely low frequency (60Hz and 120Hz) effects the cell cycle progression and the metabolic activity of the anterior pituitary gland cells in vitro
14:30-16:00	Session 5D: STA 5 - Complex Networks and System	
14:30-14:45	16	Wentao Zhu and Jovica Milanović. Cyber-physical System Failure Analysis Based on Complex Network Theory
14:45-15:00	19	Dmitry Maximov and Sergey Ryvkin. Systems Smart Effects as the Consequence of the Systems Complexity
15:00-15:15	206	Georgi Dimirovski and Yuanwei Jing. Complexity of Warfare Command, Communication and Control Systems Simplified: Optimal Resource Partitioning via Lanchester Equations
15:15-15:30	140	Bernát Wiandt, Vilmos Simon and András Kőkuti. Self-organized graph partitioning approach for multi-agent patrolling in generic graphs
15:30-15:45	120	Yushi Chen and Jovica Milanovic. Critical Appraisal of Tools and Methodologies for Studies of Cascading Failures in Coupled Critical Infrastructure Systems
15:45-16:00	88	Alexey Lagunov and Vladimir Terekhin. Modelling the Barents territory coverage area of satellite KA-SAT
14:30-16:00	Session 5E: PD 5 - Open Source Software, Predrag Pejović and Branislav Gerazov	
16:00-16:30	Coffee Break	
16:30-18:00	Session 6A: Track 1_1 - Information, Communication and Technology	
16:30-16:45	211	Bojan Kostadinov, Mile Jovanov and Emil Stankov. Cost-effective website failover solution through a CDN network and asynchronous replication
16:45-17:00	106	Ivana Stupar and Darko Huljenic. Analyzing Service Resource Usage Profiles for Optimization of Cloud Service Execution Cost
17:00-17:15	58	Mohamed Elgebali, Moustafa Elbery, Assem Mohamed, Ali El-Deen Shash, Amr Abdel Hamid, Hend Sadek, Hassan Halawa, Malak Elsalamouny, Ramez Daoud, Hassanein Amer, Hany Elsayed and Ahmed Khattab. Enhanced Data Gathering for Firefighting Applications
17:15-17:30	54	Faraz Fatemi Moghaddam, Philipp Wieder and Ramin Yahyapoor. POBRES: Policy-Based Re-Encryption Schema for Secure Resource Managment in Clouds
17:30-17:45	17	Mark Mallia and Carl James Debono. Rendering of Free-viewpoint Video on the Cloud
17:45-18:00	73	Igor Popov, Martin Mihajlov and Oliver Popov. mashpoint: Surfing the Web in a Data-

		Oriented Way
16:30-18:00	Session 6B: STA 3_2 - Bioelectromagnetic Medicine and Bioinformatics	
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16:45-17:00	171	Golubev Alexandr, Peter Bogatencov and Nicolai Iliuha. “DICOM Network” services
17:00-17:15	31	Saba Amirdehi, Khalil El Khamlichi Drissi, Christophe Pasquier, Benoit Sion, Lénaïc Monconduit and Vesna Arnautovski Toseva. Analysis of Electrophysiological Activities Using Matrix Pencil Method
17:15-17:30	64	Mohamad Mahdi, Malek Hmadeh and Fares Abdulkhalek. EasyMedz, The New Trend Medicine Preordering
16:30-18:00	Session 6C: STA 7 - Hybrid Intelligent Systems	
16:30-16:45	52	Jerzy Tchorzewski and Dariusz Rucinski. Quantum Inspired Evolutionary Algorithm to Improve the Accuracy of a Neuronal Model of the Electric Power Exchange
16:45-17:00	79	Muhammed Fatih Adak and Nejat Yumusak. Development of Smart Gas Sensor System to Classify Binary Gas Mixtures
17:00-17:15	51	Figen Ozen, Umur Kuntan and Dilek Tukel. Robot-Music Synchronization: Self-Designed Dance
17:15-17:30	93	Senem Tanberk and Dilek Tükel. Kinect Controlled Chess Playing Robot
17:30-17:45	213	Georgi M. Dimirovski and Yunlong Liu. WAN Networked Control Systems Implemented by Computer Control: Sampled-Data Synthesis
16:30-18:00	Session 6D: PD 2 - Nuclear Energy in Europe, Nikola K. Popov, Marko Čepin and Anton Čausevski	
16:30-18:00	Session 6E: Tutorial - Internet of Things for Smart Buildings - Current and Future Trends, Muhammad Alam	
19:00-20:00	Session 7: Presentation of the IEEE Young Professionals and IEEE Professional Activities	
20:00-23:00	Session 8: Plenary Lecture - Goce Arsov _ IEEE Republic of Macedonia Section - 20 Years Devoted to the Benefit of the Profession	

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08:45-09:00	126	Matej Krpan and Igor Kuzle. Linearized Model of Variable Speed Wind Turbines for Studying Power System Frequency Changes
09:00-09:15	33	Moses Peter Musau, Abungu Nicodemus Odero and Wabuge Cyrus Wekesa. Implementation of Environmental Decision Making Tool For Renewable Energy Utilization: A Case of Wind and Solar
09:15-09:30	20	Erkan Dursun and Beyhan Kilic. Integration of Innovative Photovoltaic Technology to the Railway Trains: A Case Study for Istanbul Airport-M1 Light Metro Line
09:30-09:45	218	Vanja Varda and Igor Kuzle. The Influence of Renewable Energy Systems, Energy Storage and Electrical Vehicles on Croatian Power System Operation
09:45-10:00	107	Tara Petric, Charlotte Dupont and Franck Le Gall. Evaluating benefits of adding intelligence to small-scale renewable energy systems
08:30-10:00	Session 9B: STA 2_1 - The Future of Smart Technologies and Intelligent Infrastructures	
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08:45-09:00	101	Afef Mdhaffar, Tarak Chaari, Kaouthar Larbi, Mohamed Jmaiel and Bernd Freisleben. IoT-based Health Monitoring via LoRaWAN
09:00-09:15	60	Michal Tarkowski, Mateusz Rzymowski, Łukasz Kulas and Krzysztof Nyka. Improved Jamming Resistance Using Electronically Steerable Parasitic Antenna Radiators
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08:30-09:00	223	Mathieu Jadin and Gautier Tihon. Securing MultiPath TCP
09:00-09:30	224	Istvan Taczi. Enhancing Power System Frequency Stability with Synthetic Inertia
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08:45-09:00	166	Sonja Filiposka, Roman Łapacz, Michal Balcerkiewicz, Frank Wein and Jerry Sobieski. Transforming Silos to Next-Generation Services
09:00-09:15	184	Aleksandra Zdravevska, Ace Dimitrievski, Petre Lameski, Eftim Zdravevski and Vladimir Trajkovik. Cloud-based Recognition of Complex Activities for Ambient Assisted Living in Smart Homes with Non-Invasive Sensors
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08:30-10:00	Session 9E: Track 2_2 - Circuits, Systems and Signal Processing	
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08:45-09:00	100	Ivan Milosavljević, Đorđe Glavonjić, Dušan Krčum, Darko Tasovac, Lazar Saranovac and Vladimir Milovanović. An FMCW Fractional-N PLL-based Synthesizer for Integrated 79GHz Automotive Radar Sensors
09:00-09:15	65	Jian Gao and Hamidou Tembine. Correlative Mean-Field Filter for Sequential and Spatial Data Processing
09:15-09:30	38	Elit Cenk Alp and Hacer Yalim Keles. Action Recognition Using MHI Based Hu Moments with HMMs
09:30-09:45	22	Patrick Schmitt, Markus Lechner and Roman Beneder. Development of a low-cost, open-source measurement equipment for undergraduate courses dedicated to embedded systems
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10:30-12:00	Session 10A: STA 12_2 - Cloud Based Infrastructure and Platforms for Big Data	
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10:45-11:00	162	Katja Gilly, Sonja Filiposka and Carlos Juiz. Towards an enhanced VM placement solution for power-aware cloud environments
11:00-11:15	24	Natasa Paunkoska, Ninoslav Marina and Aneta Velkoska. Efficient Distribution and Improved Security for Reliable Cloud Storage System
11:15-11:30	170	Sonja Filiposka, Anastas Mishev and Katja Gilly. Balancing High Performance and Energy Efficiency in Cloud Allocation Problems
11:30-11:45	188	Gorgi Kakasevski and Anastas Mishev. Optimization and Scheduling Algorithm for Data Intensive Workflows in Distributed Data Mining Architecture
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11:15-11:30	27	Salih Ergun. Lessons Learnt from the Cryptanalysis of a Chaos Based Random Number Generator
11:30-11:45	18	Luke Zammit and Carl James Debono. Improved Reconstruction of Downsampled MV-HEVC Depth Video
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16B	2017-07-08	10:30-12:00	STA 1/6 - Disruptive Technology Directions for 5G and Ultra High Speed Wireless and Optical Technologies for 5G	Eckhard Grass
16C	2017-07-08	10:30-12:00	SS 1 - WAMPAC - Towards Future Power Transmission System	Rafael Mihalič
16D	2017-07-08	10:30-12:00	STA 9/11_2 - Smart Technologies in Electrical Machines and Drives	Mauro Bortolozzi
16E	2017-07-08	10:30-12:00	IEEE Young Professionals Workshop: Improvisional Skills	Jan Verveckken
17	2017-07-08	12:00-12:45	Plenary Keynote Lecture 6 - Eckhard Grass - 5G Mobile Networks: Implications for Operators, Verticals and End Users	Rolf Kraemer
18	2017-07-08	12:45-13:30	Plenary Keynote Lecture 7 - Rafael Mihalic - What does European Energy Turnover (Energiewende) Mean for Small Countries	Goga Cvetkovski
19	2017-07-08	13:30-14:00	Closing Ceremony	Ljupco Karadzinov