Novice Insights in Electronics and Telecommunications. SSET 2021

Student Symposium *on Electronics and Telecommunications*

Simpozionul Studenţesc de Electronică şi Telecomunicaţii

Cluj-Napoca,

Mai 2021

Novice Insights in Electronics and Telecommunications. SSET 2021

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Simpozionul Studenţesc de Electronică şi Telecomunicaţii

Facultatea de Electronică, Telecomunicaţii şi Tehnologia Informaţiei
https://etti.utcluj.ro/
Universitatea Tehnică din Cluj-Napoca,
Strada George Bariţiu nr. 26-28, 400027

UNIVERSITATEA TEHNICĂ DIN CLUJ-NAPOCA

Facultatea de Electronică, Telecomunicații și Tehnologia Informației

SSET

Simpozionul Studenţesc de Electronică şi Telecomunicaţii

Welcome SSET 2021

The Faculty of Electronics, Telecommunications and Information Technology has established a tradition, by organizing the Student Symposium on Electronics and Telecommunications (SSET), whose 16th edition is held on the 28th of May 2021.

The symposium aims to stimulate the creativity and originality of our students, providing them with a formal framework for presenting their most important achievements and results. It is also an excellent opportunity for students to practice and improve their presentation and communication abilities in front of a well-informed audience, as well as to promote their abilities and knowledge acquired during the years of study.

With every edition, this event strengthens the many existing links and generates new connections between the academic and the industrial environment, given the large number of representative companies that have become partners in the symposium.

Bringing together students, faculty, and representatives of the industry in such a high-quality professional environment is a key step in improving the quality of the educational process.

This scientific event is a complementary activity, besides the main didactic and research activities, directly contributing to the successful accomplishment of the mission of our faculty: "To contribute by advanced research to the knowledge development in electronics, telecommunications and information technology, as well as to train specialists able to develop, design, implement, and exploit electronics and telecommunications systems, with applications in the most various industrial, research, and domestic areas".

The high quality of the symposium cannot be achieved without the active involvement of the organizers: the SSET committee, as well as our industry partners, have made this event possible, and my thanks go out to them. I would also like to thank the faculty teaching staff who have encouraged the students to compete in this event and coordinated their scientific endeavours.

Good luck to all the students participating at the symposium!

Professor, Ph.D. ***Gabriel OLTEAN***
DEAN of ETTI, UTCN

Student* Symposium *on Electronics and Telecommunications

Faculty of Electronics, Telecommunications and Information Technology
https://etti.utcluj.ro/
Technical University of Cluj-Napoca,
26-28 George Bariţiu st. , 400027

ETTI Bachelor Programs (Programe Licență)

Electronică Aplicată,	https://etti.utcluj.ro/Fd/articles/EaFd.html
Electronică Aplicată (engleză),	https://etti.utcluj.ro/Fd/articles/EaEngFd.html
Tehnologii şi Sisteme de Telecomunicaţii,	https://etti.utcluj.ro/Fd/articles/TstFd.html
Tehnologii şi Sisteme de Telecomunicaţii (engleză),	https://etti.utcluj.ro/Fd/articles/TstEngFd.html
Inginerie Economică în Domeniul Electric, Electronic și Energetic,	https://etti.utcluj.ro/Fd/articles/IEcon.html

ETTI Master Programs (Programe Master)

Circuite și sisteme integrate,	http://www.bel.utcluj.ro/master_csi/index.php?lang=r
Inginerie electronică,	https://etti-master.utcluj.ro/index.php/programe-de-studiu/#ie
Prelucrarea semnalelor și imaginilor (franceză),	https://etti-master.utcluj.ro/index.php/programe-de-studiu/#psi
Sisteme integrate de comunicații cu aplicații speciale,	https://etti-master.utcluj.ro/index.php/programe-de-studiu/#sicas
Tehnologii multimedia,	https://etti-master.utcluj.ro/index.php/programe-de-studiu/#tm
Tehnologii, sisteme și aplicații pentru eActivități,	https://etti-master.utcluj.ro/index.php/programe-de-studiu/#eact
Telecomunicaţii,	https://etti-master.utcluj.ro/index.php/programe-de-studiu/#tc

ETTI PhD Programs (Programe Doctorat)

Principalele informații utile:	https://etti.utcluj.ro/scoala-doctorala.html

Principalele direcții de cercetare în ETTI

În cadrul facultății există o serie de direcții de cercetare, care sunt sintetizate după cum urmează:

- **Analiza şi sinteza circuitelor electronice**
- **Microelectronica - circuite analogice şi digitale VLSI**
- **Tehnici moderne de prelucrare a semnalelor**
- **Optoelectronică şi comunicații optice**
- **Comunicații unificate în Internet**
- **Procesarea imaginilor şi secvențelor video**
- **Recunoașterea automată a vorbirii, sinteza din text a vorbirii**
- **Prelucrarea și securitatea datelor**
- **Software pentru electronică și telecomunicații**
- **Radiocomunicații celulare și prin satelit**
- **Sisteme electronice de putere**
- **Sisteme electronice de monitorizare și control**
- **Energii regenerabile**
- **Senzori și sisteme de achiziție a datelor.**


SSET 2021
SSET
ETTI
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Obiective
– implicarea studentilor in activitatile de cercetare stiintifica
– crearea unui cadru stimulativ de interacţiune, schimb de idei şi experienţe;
– afirmarea studenţilor cu preocupări deosebite pentru rezolvarea de probleme din domeniile electronică, telecomunicaţii şi domenii conexe.
editia XVI
ETTI

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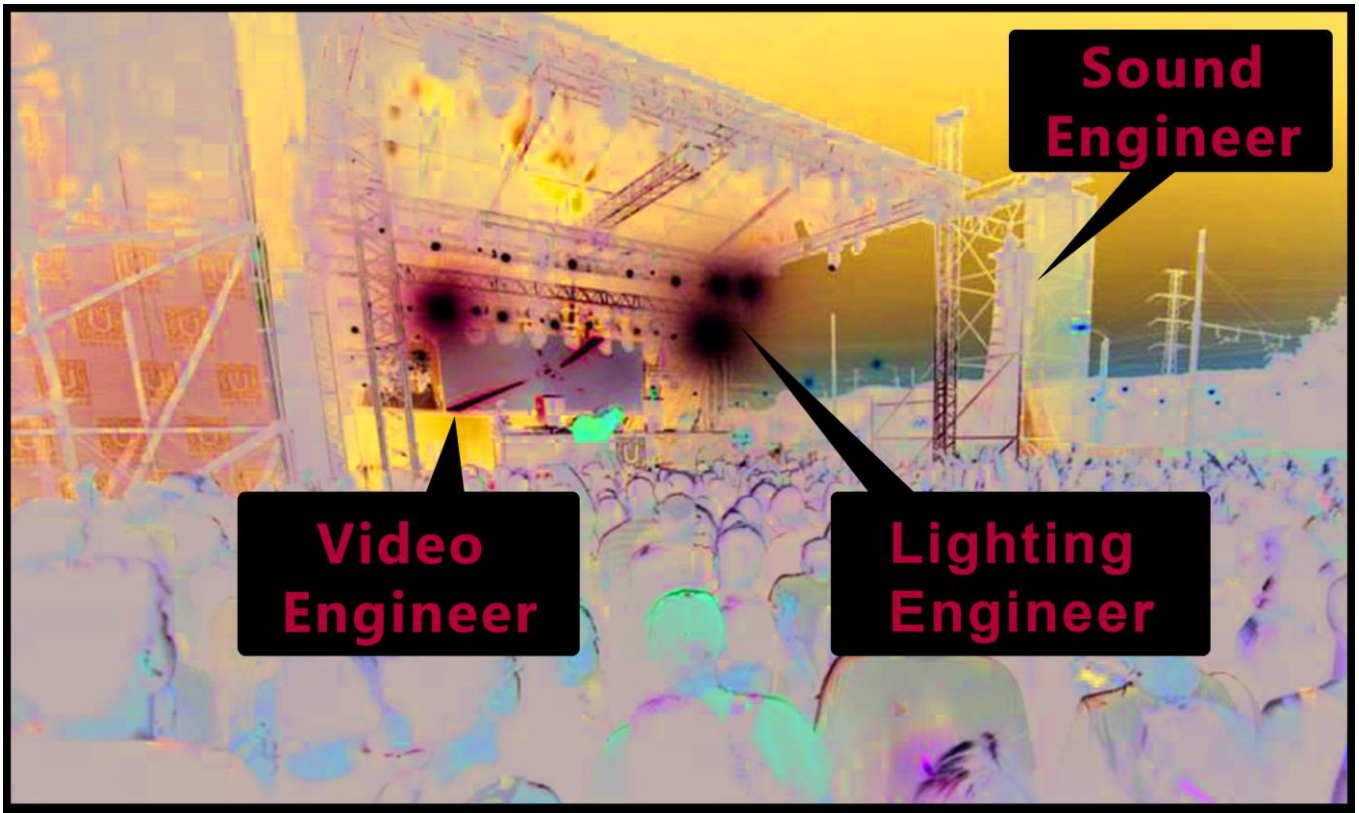
Email: office@vonconsulting.ro



Dani Sound activează de peste 20 de ani în industria spectacolelor, atât prin furnizarea și operarea echipamentelor necesare desfășurării acestora cât și prin consultanță personalizată.

De-a lungul timpului, Dani Sound a contribuit la o gamă variată de evenimente precum: Untold Festival, Lord of the Dance, Sports Festival, Opera Aperta, Peninsula, Techsylvania, TEDxCluj, Festivalul Dilema Veche, Balul Operei, Cerbul de Aur, Baletul pe gheață St. Petersburg, Kings On Ice, All Star Game și multe altele.

Dani Sound a colaborat cu majoritatea artiștilor naționali. Au fost și colaborări cu artiști internaționali dintre care enumerăm: James Blunt, Jean Michel Jarre, Beyonce, Julio Iglesias, Jose Carreras, Andrea Bocelli, Joe Satriani, Al Di Meola, Zucchero, Pink Martini, Lara Fabian, YAMATO, Vaya Con Dios, Nigel Kennedy, Haddaway, Culture Beat, Ingrid, Nadia Ali, Ana Moura, Tarja, Nazareth, Chris Norman, Smokie, Richard Clayderman, Toto Cutugno, Goran Bregovic, Edwin Marton, Tiesto, Parov Stelar, ATB, Paul Kalkbrenner, Guru Josh, Wilkinson, Foreign Beggars, Pendulum și lista continuă.

Mai multe detalii pe:
www.danisound.ro

DANI SOUND

Students @ Bosch Cluj Plant

BOSCH
Tehnică pentru o viață

Student	Bosch
Cerințe de bază: știm că e de la sine înțeles, dar trebuie să fii înscris la cel puțin o universitate.	**Oportunități:** oferim niveluri diferite de colaborări - doar pentru a fi siguri că vei rămâne cu noi.
Abilități tehnice: fie că e software, hardware, important e că știi să le faci să funcționeze.	**Beneficii:** nu îți face griji, e un program plătit. Cu transport inclus. Și program flexibil. Și cu bilete la diferite evenimente.
Priceput la engleză și la Microsoft Office: da, condițiile pe care le citești în toate decrierile joburilor - dar, să fim sinceri, sunt cam vitale.	**Tehnologie:** Internetul Obiectelor? Îl avem. Industrie 4.0? Aici. Cea mai nouă aparatură din industrie? Floare la ureche.
Mod de gândire: identificarea extraordinarului în comun nu este ceva înnăscut, dar gândirea critică te poate duce acolo.	**Procese:** te ajutăm să îți atingi obiectivele chiar și atunci când te copleșește entuziasmul
Pasiune: căutăm incitatorii schimbării, studenți entuziaști să facă prima mișcare.	**Carieră:** la fiecare mușcătură de ciocolată pe care o iei, mentorul tău va fi acolo să te ajute. Bineînțeles, oferă și sprijin pentru dezvoltarea ta.

Multiplayer:
asemenător cu experiența ta din jocuri video - să spunem doar că aici vei descoperi următorul nivel.

Integrarea proiectelor:
relațiile sunt greu de întreținut, dar sunt cheia unei colaborări avantajoase pentru toată lumea.

Contextul vieții reale:
în sfârșit, un loc în care poți aplica ceea ce ai auzit la cursurile lungi și complexe.

Date:
îți e frică de lucrarea de diplomă? Nu te teme, avem noi grijă de tine.

Final fericit:
de asemenea, putem lua în considerare un parteneriat pe termen lung.

www.bosch-career.ro

Programe de studenți

Working Student

Conducere autonomă, sisteme de propulsie electrică, industrie conectată, Internet of Things (IoT), sau Industry 4.0 - cu noi vei avea posibilitatea să lucrezi în domenii diferite chiar în timpul studiilor. Vei lucra într-un mediu internațional, cu un program de lucru flexibil, part-time sau full-time.

Junior Managers Program

Îți place să deții o vedere amplă asupra domeniului de activitate? Accelereaza-ți cariera cu ajutorul programului JMP pe o perioadă între 18 și 24 de luni, unde fiecare etapă va contribui la creșterea competențelor tale. Vei fi implicat în proiecte care te vor ajuta să îți dezvolți abilitățile de manager și, în paralel, vei avea parte de ghidare profesională din partea mentorului tău.

Job de vară

Și la muncă, și la mare? Dacă îți dorești un job de scurtă durată, dar de impact, programul de practică de la Bosch Cluj Plant este potrivit pentru tine. Din iunie și până în septembrie, poți fi direct implicat în echipă, iar experiența ta cu Bosch îți va oferi un start valoros pentru viitorul carierei tale.
Fii cu ochii pe site-ul nostru începând din aprilie.

Bosch Engineering Center Cluj plays an essential role in the great transformation of the mobility sector ever since its foundation in 2013. With our vast expertise in software, hardware & mechanical and reliability engineering, but also in sales planning, we contribute to the development of excellent products, services and innovative AIoT solutions for **automated driving, connected & electric mobility** and **connectivity**. Thanks to the close collaboration with other Bosch Engineering Centers and with Bosch Cluj Plant, we offer unique solutions to our clients from around the world.

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We have **top-notch engineers** with **+15 years of experience** in working with global and industry leaders.

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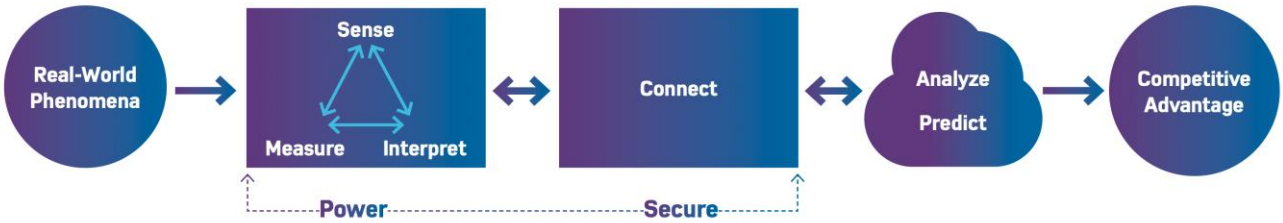
How ADI's expertise converts real-world phenomena into insight that transforms our customers' industries:



What in the world do you need to monitor? Heart rate, temperature, light, motion, moisture, velocity, vibrations, volume, frequencies, power... whatever the signals, we have ways to sense and measure them.

ADI's suite of capabilities and cutting-edge technologies enable us to sense, measure and interpret signals with domain-relevant algorithms. Power and security are an integral part of developing smart solutions.

Our world-renowned leadership in RF and signal processing has put us at the forefront of 5G and beyond. Working across domains, from aerospace and autonomous machines to personal wearables, ensurs that ADI's expertise for optimal connectivity in the most challenging environments is second to none.

From the world to the "fog" or the "cloud," create real-time, actionable insights with ADI's robust analytics. Better quality data means more effective predictive systems, machine learning and artificial intelligence.

16,000	4,700+	125,000	55
Problem Solvers	Patents Worldwide	Customers	Years

Ahead of What's Possible

Analog Devices is a global leader in the design and manufacturing of analog, mixed signal, and DSP integrated circuits to help solve the toughest engineering challenges.

Analog Devices. Dedicated to solving the toughest engineering challenges.

Analog Devices: Profile

Corporate Snapshot

Founded: **1965**

Patents: **4700+**

R&D investment since 2008: **$4 billion**

Employees: **15,000 worldwide**

Global reach: **20+ countries**

Design Centers: **~45**

Listings: **Nasdaq:ADI**

Business Units

Aerospace and Defense
Automotive Electrification
Autonomous Transportation
Communications
Consumer
Energy
Healthcare
Industrial Automation
Instrumentation
Power

Capabilities

Sense: Capture precision data in demanding environments

Measure: Turn data points into actionable information

Interpret: Embed algorithms to enable insights

Secure: Embed security where data is born

Connect: Deliver reliable communication in challenging contexts

Power: System-level power management

Industry Recognition

Technology Leadership
Forbes:
Top 100 Global Digital Companies

Management Leadership
Wall Street Journal:
Management Top 250

Corporate Citizenship
Corporate Knights:
100 World's Most Sustainable Corporations

Employee Satisfaction
Forbes:
America's Best Large Employers

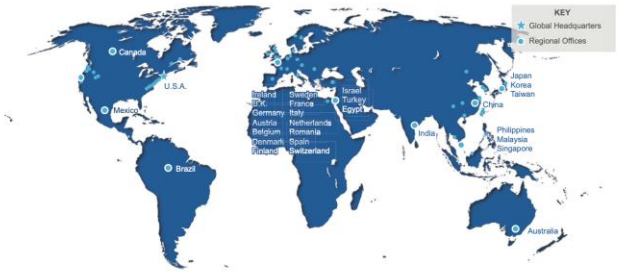
Romania Design Center

Founded: **2011**

Employees: **~50**

Location: **United Business Center Riviera, Cluj-Napoca**

Presence in over 20 countries to provide direct sales, field application engineers, distribution, design and technical support worldwide



ADI Careers

Many Opportunities. One Impactful Company.

Dare to dream it, and we'll help you make it a reality. At Analog Devices, we invest in our people, so they can engineer solutions that sense the world around us and make it better. Explore jobs at ADI where you have the freedom, training and opportunity to design solutions that transform our life experiences.

Available jobs, Cluj-Napoca location:

Embedded Software Engineer
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FPGA/HDL Engineer
Hardware Engineer
Computer Vision Software Engineer
Software Engineer
UI & Middelware Software Engineer
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Submit online application:

https://careers.analog.com
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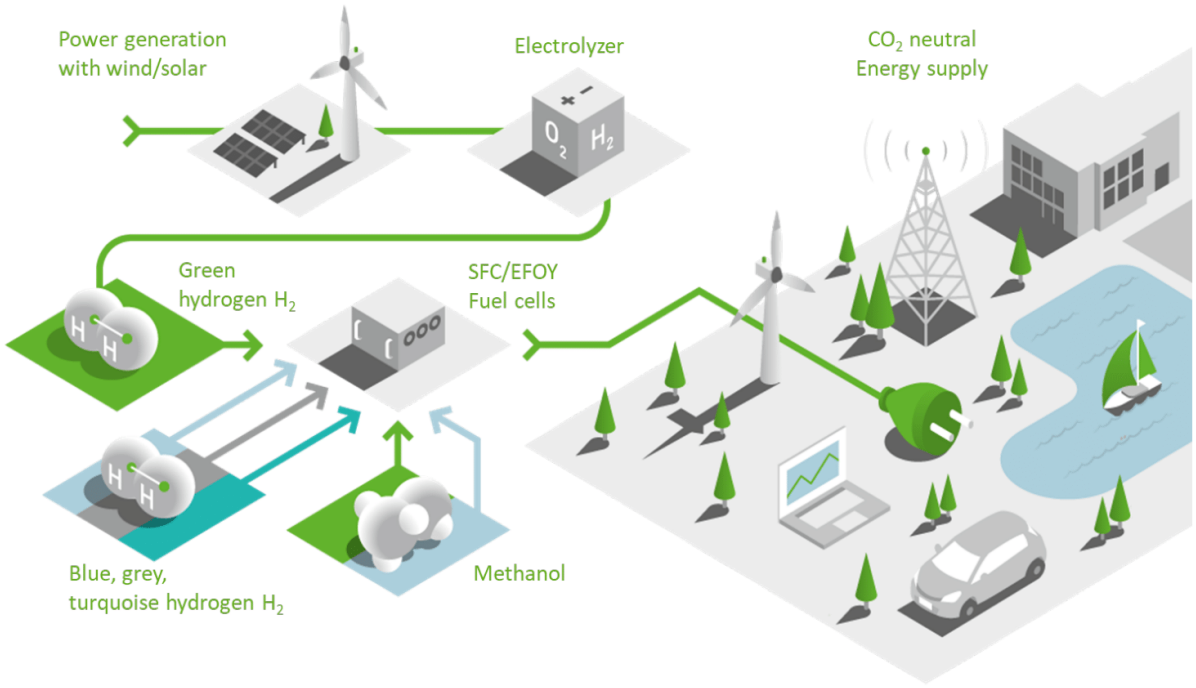
on all markets

SFC Energy is a globally leading company specialising in mobile energy solutions and power management for the clean energy & mobility, defense & security, oil & gas and industrial markets.



DIVISION Coils & Linear Drives

Products:

- Customised (special) **coil assemblies**
- High precision **linear drives**
- **Co-development**
- High quality proven processes
- Single, bifilar & trifilar **Orthocyclic** winding
- **Foil** winding
- Coil **bending**
- Expertise in **water cooling** and thermal management

- **Pressure and flow** testing equipment
- **3D Measuring** capabilities
- **Automated testing** equipment

DIVISION Power Suppy Solutions

Products:

- Standard and semi standard **High Power platform design**
- **Modular and scalable** approach to fit customer needs
- Water-cooled with integrated **safety interlock** level
- **Full custom** power supply solution

Powering your Innovation

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Nokia is a global leader in the technologies that connect people and things. Powered by the innovation of Bell Labs and Nokia Technologies, the company is at the forefront of creating and licensing the technologies that are increasingly at the heart of our connected lives. Nokia Romania is a strong presence on the global map of telecommunications, with more than 1600 employees, being the biggest telecom R&D center in Romania. Here, at Nokia, we innovate the future of wireless technologies through our contribution to 5G. We create the next generation of software defined networks, virtualized network functions, predictive analytics and we manage over 250 000 network elements worldwide.

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Reach for the sky...more precisely, for the clouds!

Cloud Computing.
Application enablement.
Network function virtualization.

OPERATIONAL EXCELLENCE!

Monitor the flow of connections.

Manage new generation wired/wireless networks.
Manage global network operations, implementation and integration services.

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System engineering.
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Email your cv at:
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NOKIA

Present Edition (SSET 2021)

SSET2021 Sections

Section 1 - ORAL Presentations: Bachelor Student – TST-IM
Dedicated to papers from *IET and IM* domains, with Bachelor authors;

Section 2 - ORAL Presentations: Bachelor Student – EA-IM
Dedicated to papers from *IET and IM* domains, with Bachelor authors;

Section 3 - ORAL Presentations: Master/Doctor (PhD) Student
Dedicated to papers from *IET* and *IM* domains, with Master and PhD Students;

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SSET Co-Chairman:

Prof. Ovidiu POP, PhD
Assoc.Prof. Nicolae CRIŞAN, PhD

Organizing Committee:

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Assist.Prof. Lorant SZOLGA, PhD
TeachingAssist. Elena ȘTEȚCO
Eng. Angela RUSU

SSET 2021 Scientific Committees

***TST-IM* STUDENT ORAL Presentations Committee**

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Professor Ioan CIASCAI, PhD
Professor Romulus TEREBEȘ, PhD
Professor Ramona GĂLĂTUȘ, PhD
Associate Professor Botond KIREI, PhD

Symposium Program

The event takes place on Friday, 28th of May, according to the below detailed timetable:

Starting Time	Events	TST-IM	EA-IM	Master/Doctor
08:45	Opening Speech			
09:00	ORAL Presentations	9:00 – 11:15 S1	9:00 – 12:45 S2	9:00 – 10:30 S3
13:00	Partners Presentations	Infineon, Bosch, NTT Data, Analog Devices, NFC Energy		
14:15	Award Ceremony			
	Closing Word			

Presentations – Section 1 (Student TST-IM)

9:00 - *S1.1* ***„Comparison of neural networks architecture for automatic classification of COVID-19 and pneumonia from X-rays”,***
Flavius Denis Moldovan — Coordinator: Adriana Stan

9:15 - *S1.2* ***„Web Application for the Management of an Automobile Repair Shop”,***
David Gruian, Iustin-Alexandru Ivanciu — Coordinator: Iustin Ivanciu

9:30 - *S1.3* ***„Energy Consumption and Performance Monitoring of a Software-Defined Networking Infrastructure Using ONOS and Mininet”,***
Darius Crișan, Virgil Dobrotă — Coordinator: Virgil Dobrotă

9:45 - *S1.4* ***„Web application for drone flights management using OpenLayers, Spring Boot JPA and ElasticSearch”,***
Laurențiu Halați — Coordinator: Aurelia Ciupe

10:00 - *S1.5* ***„Device Level Programmability Using RESTCONF,***
Vlad-Andrei Monoranu, Virgil Dobrotă — Coordinator: Virgil Dobrotă

10:15 - *S1.6* ***„Monitoring Air Quality Using Raspberry Pi and Amazon Web Services”,***
Cristian-Andrei Banto, Paul-Simion Crecan, Iustin Ivanciu — Coordinator: Iustin Ivanciu

10:30 - *S1.7* ***„Using Ansible to Automate the Configuration of a Cisco Router”,***
Andra-Flavia Sicoe, Virgil Dobrotă — Coordinator: Virgil Dobrotă

10:45 - *S1.8* ***„Vulnerability Exploitation of VoIP Systems Using Kali Linux”,***
Vlad Marius Ianos, Iustin-Alexandru Ivanciu — Coordinator: Iustin Ivanciu

11:00 - *S1.9* ***„Measuring and Improving Throughput and Delay in Software Defined Networks”,***
Rareș-Mihai Preda, Virgil Dobrotă — Coordinator: Virgil Dobrotă

Presentations – Section 2 (Student EA-IM)

9:00 – *S2.1* ***„Automated recycling arm”,***
Ciprian Ciuciu — Coordinator: Laura Ivanciu

9:15 – *S2.2* ***„Creating a robot that helps blind people”,***
Casian Lopatnic — Coordinator: Septimiu Pop

9:30 – *S2.3* ***„Robot car”,***
Cosmin-Theodor Negru, Ionel Horea Baciu — Coordinator: Ionel Baciu

9:45 – *S2.4* ***„Hand gesture controlled quadcopter”,***
Gheorghe Alexandru Coca, Horea Ionel Baciu — Coordinator: Ionel Baciu

10:00 – *S2.5* ***„Maze solving robot”,***
Andreea Stan, Liviu Viman — Coordinator: Liviu Viman

10:15 – *S2.6* ***„Data monitoring and acquisition system for the I2C protocol”,***
Mark Eduard Gross, Dorin Marius Petreuș — Coordinator: Dorin Petreuș

10:30 – *S2.7* ***„System that maintains a safe distance from the object or car in front to avoid accidents”,***
Cioată Sebastian — Coordinator: Dorin Petreuș

10:45 – *S2.8* ***„Time-multiplexing technique to signalize a category of parts necessary in a specific industrial process,***
Marius Ioan Toncean — Coordinator: Gabriel Oltean

11:00 – *S2.9* ***„Hand Gesture Recognition Using Convolutional Neural Networks”,***
Emilia – Elena Bonte — Coordinator: Emilia Șipoș

11:15 – *S2.10* ***„A different approach for conditional stability in Cadence Virtuoso using Nyquist”,***
Valentin Beleca, Cosmin-Sorin Plesa, Marius Neag — Coordinator: Marius Neag

11:30 – *S2.11* ***„A LDO Regulator with High PSRR”,***
Iulian Sularea, Cristian Răducan, Marius Neag — Coordinator: Marius Neag

11:45 – *S2.12* ***„Use of Technology to Enhance Agricultural Production”,***
Ionut Boncutiu, Liviu Marin Viman — Coordinator: Liviu Viman

12:00 – *S2.13* ***„Hybrid Beamforming Circuit: Design and Simulation”,***
Mihai Bolchiș, Leon Brai, Paul Faragó — Coordinator: Paul Faragó

12:15 – *S2.14* ***„Watcher - The automatic headlights control system”,***
Gabriel Catalin Breda, Ionel Horea Baciu — Coordinator: Ionel Baciu

12:30 – *S2.15* ***„Buck converter with output voltage and current control”,***
Liviu-Eusebiu Toader, Adrian Catalin Taut, Emanoil Toma — Coordinator: Adrian Taut

Presentations – Section 3 (Master/ Doctor)

9:00 – *S3.1* ***„A Python-based framework for advanced research and development on Spectrum Sensing for Cognitive Radio”,***
George Grosu — Coordinator: Romulus Terebeș

9:15 – *S3.2* ***„TEACH, a new way of learning”,***
Cosmin Ciuciu — Coordinator: Emilia Șipoș

9:30 – *S3.3* ***„Research on energy management systems for Battery Electric Vehicles”,***
Mirela Olteanu, Dorin Marius Petreuș — Coordinator: Dorin Petreuș

9:45 – *S3.4* ***„Parallel PSO Case Studies: Various Optimization Strategies Overview”,***
Mihnea-Antoniu Covaci, Lorant Andras Szolga — Coordinator: Lorant Szolga

10:00 – *S3.5* ***„Cryogenic Cooler Modeling and Optimization”,***
Mihnea-Antoniu Covaci, Lorant Andras Szolga — Coordinator: Lorant Szolga

10:15 – *S3.6* ***„Development of a low-cost high power multiple output Power Supply”,***
Vlad-Claudiu Hanăș — Coordinator: Ovidiu Pop

Paper Summary

Section 1 (TST-IM)

S1-1 „Comparison of neural networks architecture for automatic classification of COVID-19 and pneumonia from X-rays”, *Moldovan Flavius Denis*

Abstract—The global pandemic of COVID-19 is continuing to have a significant effect on the well-being of global population, increasing the demand for rapid testing, diagnosis, and treatment. Along with COVID-19, other etiologies of pneumonia constitute additional challenges to the medical system. In this regard, the objective of this work is to compare different neural networks architectures to pick the model that have the greatest accuracy on official dataset and use that model in future real world applications.

S1-2 „Web Application for the Management of an Automobile Repair Shop”, *David Gruian, Iustin-Alexandru Ivanciu*

Abstract—Well-managed automobile services are fully aware of the importance of communication and the benefits brought by good online presence. A web application is one of the most reliable methods of achieving the goals mentioned above. This paper presents a highly customizable and easy to use web application designed to provide online visibility for the company and communication methods between customers and the automobile service. The application was developed in Laravel using the Voyager package for backend management. The application consists of an administrator dashboard for managing content and user messages and a client side which contains details about the services provided and multiple forms for the customers.

S1-3 „Energy Consumption and Performance Monitoring of a Software-Defined Networking Infrastructure Using ONOS and Mininet”, *Darius Crișan, Virgil Dobrotă*

Abstract: This paper showcases a virtualized environment emulating a Software-Defined Network Infrastructure representing a configurable Data Center with top-of-the rack (ToR) high-availability (HA) switch topology with redundant links, using Mininet for the virtual host emulation, ONOS Controller for providing topology management using OpenFlow and VirtualBox for the virtualized box the model is running on.

S1-4 „Web application for drone flights management using OpenLayers, Spring Boot JPA and ElasticSearch”, *Laurențiu Halați*

Abstract— This paper explains the necessity of an application used for scheduling drone flying plans and the approach used to create the application using JavaScript libraries such as OpenLayers combined with Java and Elasticsearch to create the API.

S1-5 „Device Level Programmability Using RESTCONF”, *Vlad-Andrei Monoranu, Virgil Dobrotă*

Abstract— This paper presents the virtualized testbed with one Cisco CSR1000v 16.6.7 router with RESTCONF protocol enabled and connected to cloud. The topology is emulated in GNS3 version 2.2.19 and controlled by Postman API client.

S1-6 „Monitoring Air Quality Using Raspberry Pi and Amazon Web Services”, *Cristian-Andrei Banto, Paul-Simion Crecan, Iustin-Alexandru Ivanciu*

Abstract—This paper presents a simple Internet of Things system for monitoring air quality using Raspberry Pi and the dedicated Sensirion SPS30 sensor. The data gathered by the sensor is stored in the Amazon Web Services cloud and represented graphically using Grafana dashboards. An alerting service warns the users whenever the concentration of particulate matter exceeds a predefined threshold.

S1-7 „Using Ansible to Automate the Configuration of a Cisco Router”, *Andra-Flavia Sicoe, Virgil Dobrotă*

Abstract— The focus of this paper is one of the major NetOps needs – Configuration Automation. The task of configuration management has nowadays become more challenging than ever due to both the continuously increasing number of devices in a network and device heterogeneity. Consequently, adopting an automation approach has emerged as a new imperative. The method showcased in this paper features Ansible as the automation tool and aims to manage Cisco CSR1000V Series routers.

S1-8 „Vulnerability Exploitation of VoIP Systems Using Kali Linux”, *Vlad Marius Ianos, Iustin-Alexandru Ivanciu*

Abstract—This paper presents two types of attacks on an Asterisk server using specific tools (Nmap and inviteflood) from the Kali Linux distribution. For the first attack, a call is issued using a spoofed caller ID. In the second scenario, the attacker gains access to the Asterisk Manager Interface and retrieves call details.

S1-9 „Measuring and Improving Throughput and Delay in Software Defined Networks”, *Rares-Mihai Preda, Virgil Dobrotă*

Abstract— In order to achieve a more efficient traffic path through a network, multiple applications were developed for the RYU Software Defined Network (SDN) controller. Mininet was used to build a topology having variable delays. The applications in conjunction with the functions implemented by the RYU controller enable traffic forwarding based on more complex metrics such as delay and available transfer rate. The modified Dijkstra algorithm computes the most efficient path between the source and destination ensuring the best possible performance given the metrics considered. The proposed solution leads to an overall improvement in the delay between network nodes, increased fault tolerance and dynamic load balancing.

Section 2 (EA-IM)

S2-1 „Automated recycling arm”, *Ciuciu Ciprian*

Abstract—The importance of waste recycling is no longer a secret to anyone. However, the recycling rate in the world is relatively low, people are not interested enough in this problem. The paper presents an intelligent, autonomous system, capable of sorting waste, with a low price and good speed, which can be place in special waste selection centers.

S2-2 „Creating a robot that helps blind people”, *Lopatnic Casian*

Abstract— The system presented in this paper is a simple solution for helping all blind people in their everyday life. Its main purpose is to replace guide dogs with robots capable of doing the same job and more without the need of 2-5 years of training. Another benefit of using robots is that they adapt to their handler. A guide dog needs to be trained by special people but at times it needs to be trained with the person it will accompany so that they get used to the dog’s walking speed. A robot can be made to have any specific details that will benefit the handler from walking speed to the sensors it is equipped with.

S2-3 „Robot car”, *Negru Cosmin-Theodor*

Abstract-The purpose of this project is to create a robot car that fulfills several functions such as: line tracking, detection and obstacles avoidance, automatic headlights and remote control.

S2-4 „Hand gesture controlled quadcopter”, *Coca Gheorghe Alexandru*

Abstract— In this paper I want to present the steps of building a drone using Arduino and also a method to replace the classic RC transmitter (a remote) with a glove that can control the quadcopter using hand gestures. The main components of a drone are: flight controller which I replaced with an Arduino Uno, receiver, transmitter, frame, brushless DC motors, ESC(electronic speed controllers), propellers and a power bank which is a LiPo(Lithium polymer) battery. The gesture control is implemented using an IMU(inertial measurement unit) that measures angular rate and transmits this values through an antenna to the receiver.

S2-5 „Maze solving robot”, *Andreea Stan*

Abstract—A maze solving robot is a system capable of autonomously moving in a maze in order to find the path to the exit without any human intervention. The robot is controlled with PSoC Development Kit provided by Cypress which is programmed with a Wall Follower Algorithm for making its own movement decisions. The device uses ultrasonic sensors to acquire distance information and then performs various tasks depending on the data received. A PID controller is implemented for the purpose of straight-line motion based on the difference between the distances from the robot to the right and to the left wall.

S2-6 „Data monitoring and acquisition system for the I2C protocol”, *Mark Eduard Gross*

Abstract—This electronic document represents a resume of the study about a data acquisition system for monitoring and debugging an I2C (Inter Integrated Circuit) communication. The system has the role of a sniffer: it does not interfere with the data communicated between the master and slave. It can be connected to only one I2C bus at the time and it sends the data using the USB (Universal Serial Bus) to the computer. The acquired data will be displayed using an interface created in LabVIEW, while also being saved in a separate file. This system consists of a microcontroller with integrated SPI (Serial Peripheral Interface) peripheral and a SPI to USB transceiver. The USB connection will also power the device.

S2-7 „System that maintains a safe distance from the object or car in front to avoid accidents”, *Cioată Sebastian*

Abstract—A detailed analysis of accidents on roads in Romania and various methods to reduce the number of accidents caused by not adapting to the safety distance from other road users but also exceeding the legal speed limit.

S2-8 „Time-multiplexing technique to signalize a category of parts necessary in a specific industrial process”, *Toncean Marius Ioan*

Abstract—This paper presents a solution to improve an industrial process by signalizing the parts categories necessary in a specific industrial process from a multitude of available parts categories. The necessary categories are signalized by turning on a green LED for the necessary parts in the industrial process and a red LED for the parts that are not necessary. To save some amount of energy for signalizing and to reduce the wiring complexity we will use the time-multiplexing technique.

S2-9 „Hand Gesture Recognition Using Convolutional Neural Networks”, *Bonte Emilia – Elena*

Abstract— This paper presents a method for recognizing human hand gestures using a convolutional neural network. Efforts should be made to adapt computers to our natural way of communication: body language. Hand gesture recognition serves as a key for overcoming many difficulties and providing convenience for human life. The ability of machines to understand human activities and their meaning can be utilized in a vast array of applications. This paper presents different stages in training the convolutional neural network: data acquisition, images pre-processing, image segmentation and gesture classification.

S2-10 „A different approach for conditional stability in Cadence Virtuoso using Nyquist”, *Valentin BELECA*

Abstract - This paper presents an intuitive explanation and comes with a solution (implemented in Cadence and Matlab) of the apparent contradiction presented by a particular feedback circuit that is stable although the Bode plot of its loop gain shows that at the first -180° frequency, the magnitude of the Loop Gain is much greater than 1(linear). The solution that proves the stability of the system consists in the extraction of Poles and Zeros from the actual circuit from Cadence and translating them into Matlab where the corresponding Nyquist diagram is plotted and thus the stability of the system is verified.

S2-11 „A LDO Regulator with High PSRR”, *Iulian Sularea, Cristian Răducan, Marius Neag*

Abstract— This paper presents a capacitor-less low dropout (LDO) voltage PMOS regulator with high power supply rejection ratio (PSRR). The proposed LDO combines into a single core two differential stages: a primary one - as error amplifier for the negative feedback loop - and a secondary one, used to create a feed-forward cancellation path from the supply to the gate of the pass transistor. With this arrangement the LDO can provide a PSRR of -40dB at 1MHz for the maximum load current of 50mA. This performance is achieved with only 20µA quiescent current and a load capacitor of 100pF. The LDO is designed in a 0.18µm standard CMOS process.

S2-12 „Use of Technology to Enhance Agricultural Production”, *Ionut Boncutiu, Liviu Marin Viman*

Abstract— Agriculture is, without a doubt, the most important human activity. Future food production faces significant challenges due to population growth and climate change. Thanks to technical advancements such as sensors, computers, robots, and information technology, modern farms and agricultural practices are dramatically different from those of a few decades ago. This paper suggests two strategies for addressing some of the most important problems in agricultural development: a smart irrigation system with water management and the automatic plant disease detection using image processing algorithms. The water management system describes a design using various sensors connected with AVR microcontroller. Plant diseases are detected using image classification models trained with artificial intelligence algorithms.

S2-13 „Hybrid Beamforming Circuit: Design and Simulation”, *Bolchiș Mihai, Brai Leon, Faragó Paul*

Abstract - Watcher represents a prototype, a concept done after a revolutionary technology that brought a major contribution to the automotive industry, a technology without which driving at night would be just as difficult. Many incidents in traffic are caused by misuse of the highbeams; this device has the purpose to correct those issues, therefore solving a problem long present on our roads by automatically switching lights off from a LED matrix, when light exposure from the opposite lane's participant exceeds a certain level, thus protecting him from eyestrain and disorientation and therefore, preventing a possible incident.

S2-14 „Watcher - The automatic headlights control system”, *Breda Gabriel Catalin, Ionel Horea Baciu*

Abstract - Watcher represents a prototype, a concept done after a revolutionary technology that brought a major contribution to the automotive industry, a technology without which driving at night would be just as difficult. Many incidents in traffic are caused by misuse of the highbeams; this device has the purpose to correct those issues, therefore solving a problem long present on our roads by automatically switching lights off from a LED matrix, when light exposure from the opposite lane's participant exceeds a certain level, thus protecting him from eyestrain and disorientation and therefore, preventing a possible incident.

S2-15 „Buck converter with output voltage and current control”, *Liviu-Eusebiu Toader, Adrian Catalin Taut, Emanoil Toma*

Abstract—This paper proposed a DC-DC buck converter designed solely by analog components having educational purposes for future students to understand the concept of a converter at the lowest scale. It explains each block of a converter along with the OrCAD schemes and simulations. The test results have a good agreement with system simulation results, and the converter performs as expected.

Section 3 (Master/Doctor)

S3-1 „A Python-based framework for advanced research and development on Spectrum Sensing for Cognitive Radio”, *George GROSU*

Abstract — The work of this paper is addressing the issues of Spectrum Sensing applications for Cognitive Radio networks simulating the OFDM signal over various fading channels. One approach is a classic Energy Detection (ED) algorithm based on dynamic thresholding. The second approach is based on a Neural Network model of which inputs are the received signal, noise variance and signal power. Furthermore, is analysed the detection efficiency of the proposed approaches given various SNR values within two-base scenarios (AWGN Channel and Flat Fading Rayleigh Channel) as this parameter can affect drastically the detection performance in terms of false positives/false negatives leading to erroneous estimators. The experimental results are analysed through the Receiver Operating Characteristics (ROC) plot containing the curve for the neural network model together with the curves of classical ED approach based denoising methods. The ROC curve of denoising-based ED model suggests an overall increased performance when compared to the ROC curve of the NN model on both simulated channel models.

S3-2 „TEACH, a new way of learning”, *Cosmin Ciuciu*

Abstract: The pandemic situation forced all teachers to adapt the classic educational system to online environment. With the return of students in classes, one issue arises regarding the improvement of the educational system with the benefits of the smart devices. The paper presents a device which combines the advantages of both educational systems and offer to the students the possibility of learning new and useful abilities for day to day life. It contains a Raspberry-Pi mini-computer, a touch-screen display, and sensors. The graphical interface is built in Python and contains various activities. When the activities are finished, the students receive points; the students with biggest amount of points can receive awards at the end of the academic year.

S3-3 „Research on energy management systems for Battery Electric Vehicles”, *Olteanu Mirela, Dorin Marius Petreuș*

Abstract— This paper aims to present methods for designing charging and present an energy management system. It is known that the most sensitive and expensive element of electric cars is the battery. In this situation, it is imperative to study and discover new ways to manage battery energy.

S3-4 „Parallel PSO Case Studies: Various Optimization Strategies Overview”, *Mihnea-Antoniu Covaci, Lorant Andras Szolga*

Abstract— Recently, various topologies for heuristic optimization algorithms emerged. Implementing a highly effective heuristic optimization algorithm in order to replace manual optimization represents a challenge in various domains. The development of new models requires automatic parameter optimization in order to describe accurately a process. Hence, the work presented in this paper involves the development and analysis of a heuristic algorithm, the Parallel PSO (Particle Swarm Optimization) heuristic optimization of several models, such as a neural network, a synchronous DC/DC converter, a Hampson-Linde cryogenic cooler and helical resonator power control using polynomial interpolation in Matlab/Simulink. It also follows the possibility to further improve this algorithm.

S3-5 „Cryogenic Cooler Modeling and Optimization”, *Mihnea-Antoniu Covaci, Lorant Andras Szolga*

Abstract— Recently, the frequency of extreme weather events has been increasing globally, and global warming has become one of the major problems. Implementing highly efficient electric vehicles represents a huge challenge in the automotive domain as the zero-carbon dioxide emission becomes more desirable. The development of new high temperature superconductors allows implementing many higher efficiency electric vehicle topologies. Hence, the work presented in this paper involves the development and heuristic optimization of a Hampson-Linde cryogenic cooler in Matlab/Simulink. It also follows the possibility to achieve the superconductor state in commonly used superconductive substances.

S3-6 „Development of a low-cost high power multiple output Power Supply”, *Vlad-Claudiu Hanăș*

Abstract— This article shows how an old power supply from a personal computer (PC) that is no longer used can be turned into a multiple output power supply. The output voltages are: 3.3V, 5V, 12V. The voltages are obtained at the output of three different binding posts, another three being used as ground (GND). Furthermore, the power source also has three 5V USB connector sockets. The article presents all the necessary components used in order to build the power supply and the mandatory steps for obtaining a fully functional appliance. There will also be mentioned some important regulations that need to be fulfilled for safety purposes and ease of work. The final product can be used for most types of circuits, even for ones that require high power.