Amar Kapic

Nationality: Montenegrin   **Date of birth:** 11/09/1993

📞 **Phone number:** (+382) 67654700   ✉ **Email address:** amar.kapic@cern.ch

✉ **Email address:** amar.kapic@epfl.ch

📍 **Home:** 3 Rue des Champs Fusy, 01630 Saint Genis Pouilly (France)

WORK EXPERIENCE

Lecturer
Mediterranean University [09/2023 – Current]

City: Podgorica

- Basics of programming
- Object-oriented programming I
- Data structures and algorithms
- Computational modeling and simulation

Research assistant
CERN [07/2017 – Current]

City: Geneva
Country: Switzerland

- Designed and conducted tests to:
    - Assess radiation tolerance of environmental (humidity and temperature) sensors under controlled environmental conditions, subjecting the sensors to an accumulated fluence of 4×10 protons/ cm^2,
    - Evaluate sensor sensitivity to a strong magnetic field of 2 T,
    - Evaluate sensor performance at sub-zero temperatures and low relative humidity levels;
- Critically analyzed data obtained from the conducted tests;
- Designed, simulated and produced cost-effective, easy-to-deploy signal conditioning units for reading lossy capacitive (humidity) and resistive (temperature) sensors over long distances (~ 150 m);
- Designed, simulated and produced a multichannel readout system for processing data from hundreds of humidity and temperature sensors;
- Integration of the humidity and temperature monitoring systems in the CMS detector control and safety systems (DCS/DSS).

Teaching assistant
EPFL [09/2020 – Current]

City: Lausanne
Country: Switzerland

- EE-517: Bio-nano-chip design (Master-level course)
- EE-518: Analog circuits for biochip (Master-level course).

Assisted in exercise sessions and provided mentorship to students during their semester projects. The outcomes of the semester projects resulted in publications in top-tier peer-reviewed international journals and conferences.

Electrical engineer
Hidroenergija Montenegro [10/2015 – 01/2017]

City: Podgorica

Country: Montenegro

- Lead engineer in maintaining and operating six small hydro-power plants (sHPPs);
- Supervised equipment installation in new facilities;
- Enrolled in the design and preparation of project documentation for sHPPs and facilitated their connection to the distribution grid;
- Improved the functionality of the existing SCADA system.

EDUCATION AND TRAINING

PhD in Microsystems and Microelectronics
Institute of Electrical and Micro Engineering, EPFL [01/2019 – 08/2023]

City: Lausanne
Country: Switzerland
Thesis: Radiation-tolerant Multichannel Dew Point Temperature Monitoring System for High-Energy Physics Applications

- Doctoral thesis nominated for the **Best 8% Distinction** and the **EDMI Program Award** at EPFL by the Jury committee.

MSc in Control Engineering
Faculty of Electrical Engineering, University of Montenegro [09/2016 – 10/2018]

City: Podgorica
Country: Montenegro
Final grade: 10
Thesis: Proposal of Maximum Power Point Tracking Algorithms for Photovoltaic Panels

MSc in Control Engineering
Faculty of Electrical Engineering, University of Sapienza [02/2017 – 07/2017]

City: Rome
Country: Italy

Erasmus+ Exchange Student Programme

BSc in Power Systems and Control Engineering
Faculty of Electrical Engineering, University of Montenegro [09/2012 – 06/2015]

City: Podgorica
Country: Montenegro
Final grade: 9.91

Spec.Sci. in Power Systems and Control Engineering
Faculty of Electrical Engineering, University of Montenegro [09/2015 – 06/2016]

City: Podgorica
Country: Montenegro
Final grade: 10

LANGUAGE SKILLS

Mother tongue(s): **Montenegrin**

Other language(s):

English

LISTENING C1 **READING** C1 **WRITING** C1
SPOKEN PRODUCTION C1 **SPOKEN INTERACTION** C1

Russian

LISTENING B1 **READING** B1 **WRITING** B1
SPOKEN PRODUCTION B1 **SPOKEN INTERACTION** B1

Italian	French
LISTENING A1 **READING** A1 **WRITING** A1	**LISTENING** A1 **READING** A1 **WRITING** A1
SPOKEN PRODUCTION A1 **SPOKEN INTERACTION** A1	**SPOKEN PRODUCTION** A1 **SPOKEN INTERACTION** A1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

DIGITAL SKILLS

Information Technology Skills

Data Analysis - Matlab, Jupyter Notebook, SQL / Design, Modeling and Simulation - Simulink, LTSpice, COMSOL Multiphysics / Automation - SIMATIC Step 7, LabVIEW, WinCC OA

Programming Languages

Matlab / Python / C / C++ / Java

HONOURS AND AWARDS

Scholarship from Engineering Chamber of Montenegro (2016/2017)

Engineering Chamber of Montenegro [2017]

The best student of technical faculties in the field of spatial planning, design and construction of facilities

Award for finishing all third year exams with an average grade 10

The Student Awards Committee of Capital City – Podgorica [2016]

The Committee of Capital City awards the best student of each faculty

Award for the best student of the study program Power Systems and Control

Faculty of Electrical Engineering, University of Montenegro [2016]

Faculty of Electrical Engineering awards the best student of the generation

Award for the best student of the Faculty of Electrical Engineering

University of Montenegro [2015]

The University of Montenegro awards the best student of each faculty

PUBLICATIONS

International Journals

- A. A. A. Abbas, J. Qian, G. L. Barbruni, A. Golparvar, **A. Kapić** and S. Carrara, "A Novel Piezoresistive Microcantilever Structure for Free-Valproic Acid Sensing in Personalized Epilepsy Management," in *IEEE Sensors Journal,* vol. 23, no. 22, pp. 27885-27894, 15 Nov.15, 2023, doi: 10.1109/JSEN.2023.3319021.
- **A. Kapić**, A. Tsirou, P. G. Verdini and S. Carrara, "Uncertainty Analysis of Polymer-based Capacitive Relative Humidity Sensor at Negative Temperatures and Low Humidity Levels," in *Measurement*, vol. 209, pp. 112468, 2023, doi:10.1016/j.measurement.2023.112468.
- **A. Kapić**, A. Tsirou, P. G. Verdini and S. Carrara, "Thermal and Humidity Monitoring in "Cold" Silicon-based High Energy Physics Detectors," in *Journal of Instrumentation*, vol. 18, no. 2, pp. C02066, 2023, doi: 10.1088/1748-0221/18/02/C02066.
- **A. Kapić**, A. Tsirou, P. G. Verdini and S. Carrara, "Robust Analog Multisensory Array System for Lossy Capacitive Sensors Over Long Distances," in *IEEE Transactions on Instrumentation and Measurement*, vol. 72, pp. 1-8, 2023, Art no. 2000308, doi: 10.1109/TIM.2022.3225041
- **A. Kapic**, A. Tsirou, P. G. Verdini and S. Carrara, "Humidity Sensors for High Energy Physics Applications: A Review," in *IEEE Sensors Journal*, vol. 20, no. 18, pp. 10335-10344, 2020, doi: 10.1109/JSEN.2020.2994315.
- **A. Kapić**, A. Tsirou, P. G. Verdini and S. Carrara, "Radiation Tolerance of Capacitive Humidity Sensor for High-Energy Physics Applications," in *IEEE Sensors Letters*, vol. 3, no. 12, pp. 1-4, 2019, Art no. 2000604, doi: 10.1109/LSENS.2019.2953136.

Conference Proceedings

- C. Delgrange, A. Fulciniti, T. Veske, R. Peseux, **A. Kapic**, A. Golparvar, G. L. Barbruni and S. Carrara, "Amperometric Urine Biosensor for Rapid Point-of-Care Tuberculosis Diagnosis", IEEE Sensors, in press.
- A. Chevrot, J. Venckute, S. Cuesta, A. Golparvar, **A. Kapic**, G. L. Barbruni, and S. Carrara, "Portable Breathalyzer for Exhaled Volatile Organic Compounds Monitoring in Lung Diseases," *2022 IEEE International Symposium on Medical Measurements and Applications (MeMeA)*, Messina, Italy, 2022, pp. 1-5, doi: 10.1109/MeMeA54994.2022.9856480.
- **A. Kapić**, Ž. Zečević and B. Krstajić, "An efficient MPPT algorithm for PV modules under partial shading and sudden change in irradiance," *2018 23rd International Scientific-Professional Conference on Information Technology (IT)*, Zabljak, Montenegro, 2018, pp. 1-4, doi: 10.1109/SPIT.2018.8350452.
- **A. Kapić**, Ž. Zečević and B. Krstajić, "A Variable Step Size Perturb and Observe Algorithm for Maximum Power Point Tracking," *2017 22nd International Scientific-Professional Conference on Information Technology (IT)*, Zabljak, Montenegro, 2017, pp. 6-9, ISBN 978-86-85775-20-8.

Conference/Workshop Presentations

- **A. Kapic**, A. Tsirou, P. G. Verdini, and S. Carrara, "Multichannel Radiation-tolerant Humidity Monitoring System for CMS Inner Cold Sub-detectors," *Topical Workshop on Electronics for Particle Physics*, Geremeas (Sardinia), Italy, 2023, link: https://indico.cern.ch/event/1255624/contributions/5445356/.
- **A. Kapic**, A. Tsirou, P. G. Verdini, and S. Carrara, "Radiation-tolerant humidity monitoring system for the CMS Phase-2 Upgrade", *CMS Upgrade Days,* Geneva, Switzerland, 2023, link: https://cms-mgt-conferences.web.cern.ch/conferences/pres_display.aspx?cid=3437&pid=26309.
- **A. Kapic**, A. Tsirou, P. G. Verdini, and S. Carrara, "Thermal and Humidity Monitoring in "Cold" Silicon-based High Energy Physics Detectors," *Topical Workshop on Electronics for Particle Physics*, Bergen, Norway, 2022, link: https://indico.cern.ch/event/1127562/contributions/4904868/.
- **A. Kapic**, A. Tsirou, P. G. Verdini, and S. Carrara, "Cold detectors - Monitoring environmental parameters for operational purposes and integration in the control scheme", *Forum on Tracking Detector Mechanics*, online, 2021, link: https://indico.cern.ch/event/1017981/contributions/4348782/.
- **A. Kapic**, A. Tsirou, P. G. Verdini, and S. Carrara, "Radiation Tolerant Humidity Sensor for High Energy Physics Applications", *6th EIROforum School on Instrumentation*, Noordwijk, The Netherlands, 2019., link: https://indico.cern.ch/event/777129/

CERTIFICATES AND TRAINING

Oxford Machine Learning School 2023

[2023]

Basic Introduction to Radiation Effects on Electronics

[2023]

CERN, Geneva, Switzerland

5th Barcelona Techno Week: Semiconductor Radiation Detectors

[2021]

Online

6th EIROforum School on Instrumentation

[2019]

European Space Research and Technology Centre (ESTEC), Noordwijk, The Netherlands

Siemens – STEP7 : level 2

[2018]

CERN, Geneva, Switzerland

Siemens – STEP7 : level 1

[2018]

CERN, Geneva, Switzerland

Cosylab Summer School

[2018]

Cosylab Headquarters, Ljubljana, Slovenia

CERN Summer School

[2017]

CERN, Geneva, Switzerland

ACTIVITIES

Member of the organizing committee of the 1st Heavy Ion Therapy School, 2021, online

Member of the organizing committee and lecturer at the Particle Therapy MasterClass for high school students, 2020, online

Presenter at CERN Open Days 2019, Geneva, Switzerland

Member of the organizing committee and lecturer at the ALICE MasterClass for high school students, 2019, Podgorica, Montenegro

SEEIIST presentation at Open Science Days 2019, Podgorica, Montenegro

CERN presentation at Open Science Days 2017, Podgorica, Montenegro