

# UNA PALE

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Date and place of birth: 1992., Croatia

## ACADEMIC EDUCATION

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- 02/2018 – Present **PhD student in electrical engineering/neuroscience**  
École polytechnique fédérale de Lausanne, Switzerland
- 09/2014 – 09/2016 **Master of Science in Electrical Engineering and Information Technology**  
Faculty of Electrical Engineering and Computing, University of Zagreb, Croatia (GPA: 4.8/ 5.0)
- 09/2015 – 03/2016 **Erasmus exchange**  
at Master program Biomedical Engineering, Technical University of Vienna, Austria
- 09/2011 – 07/2014 **Bachelor of Science in Electrical Engineering and Information Technology**  
Faculty of Electrical Engineering and Computing, University of Zagreb, Croatia (GPA: 4.7/ 5.0)
- 09/2011 – 09/2013 **Collegium General Physics (4 semesters)**  
Physics department, Faculty of Science, University of Zagreb, Croatia (GPA: 4.8/ 5.0)
- 09/2007 – 09/2011 XV. gymnasium (Gymnasium of Natural Sciences and Mathematics), Zagreb, Croatia

## WORK EXPERIENCE

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- 02/2017 – 06/2017 **Development engineer**  
UMO neuroscience j.d.o.o, Zagreb, Croatia  
Working on a patent of an algorithm for automatic detection of Cz electrode on a neurofeedback headset which is developed within the company.
- 07/2015 – 09/2015 **Summer intern**  
Robert Bosch GmbH, Robert Bosch Research Center Renningen, Stuttgart, Germany  
Programming Fanuc robot and industrial cameras for automatic video inspection of products.

## RESEARCH EXPERIENCE

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- 09/2016 – 08/2017
  - *Nadi shodana breathing technique's influence on autonomic nervous system*  
The main idea of research is to determine how does yoga breathing technique "Nadi shodana" affects on autonomic nervous system which is assessed using heart rate variability. Research is conducted The University Hospital Centre in Zagreb, Croatia.
- MSc thesis
  - *Electromyographic biofeedback system*  
Design, construction and testing of a compact-size, wireless (BLE) and surface EMG measurement system for personal use, with developed Android application (Java) for user interface. Main usage of device would be for physiotherapy trainings.
- Graduate project
  - *Contactless assessment of heart rate and pulse transit time using Eulerian video magnification*  
Idea of this project was to evaluate if Eulerian video magnification applied to video recordings of palpation sites of human could be used for contactless heart rate (HR) and pulse transit time (PTT) assessment. Project was done at Technical University of Vienna, Austria.
- Biomedical sensors and signals seminar
  - *Heart rate variability analysis using wavelet transform*  
In this seminar, three methods of wavelet transform were used and tested for heart rate variability (HRV) extraction from HR signal. Project was done at Technical University of Vienna, Austria. With this work I participated at "Mipro conference" (2016).
- BSc thesis
  - *Modeling of bee's movements in a biohybrid simulator*  
In this project bees' reaction and movement in a field with a temperature gradient was researched and as a result two models were proposed and compared with real movement recordings.
- Undergraduate project
  - *Coordinated control of autonomous quadcopter and mobile robots*  
The task of the project was to use autonomous quadcopter to coordinate and lead mobile robots that randomly move within an arena in certain smaller area. I worked on image processing for detection and localization of mobile robots within arena.

## SCIENTIFIC PAPERS AND CONFERENCES

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- U. Pale, T. Teijeiro, and D. Atienza, "Exploration of Hyperdimensional Computing Strategies for Enhanced Learning on Epileptic Seizure Detection", arXiv:2201.09759, 2022
- U. Pale, T. Teijeiro, and D. Atienza, "Multi-Centroid Hyperdimensional Computing Approach for Epileptic Seizure Detection", arXiv:2111.08463, 2021

- U. Pale, T. Teijeiro, and D. Atienza, "Systematic Assessment of Hyperdimensional Computing for Epileptic Seizure Detection," *EMBC 2021*
- F. Dell'Agnola, U. Pale, R. Marino, A. Arza Valdes, and D. Atienza, "MBioTracker: Multimodal Self-Aware Bio-Monitoring Wearable System for Online Workload Detection," *IEEE Trans. Biomed. Circuits Syst.*, 2021
- U. Pale, N. Müller, A. Arza, and D. Atienza, "ReBeatICG: Real-time Low-Complexity Beat-to-beat Impedance Cardiogram Delineation Algorithm," *ArXiv210501525*, 2021
- Pale U., Atzori M., Müller H., Scano A.: *Synergies in Hand Grasps: Analysis of Intra- and Inter-Session Data*, MDPI Sensors 2020
- Pale U., Cifrek M., Krois I., Peharec S.: *Personal electromyographic biofeedback system „MyMyo“* CMBEBIH International Conference on Medical and Biological Engineering, 2017

## HONOURS AND AWARDS

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- Gold medal in 9th "International Exhibition of Inventions" (Kunshan, China) 2016 and Silver medal in 14th "International Innovation Exhibition" (Zagreb, Croatia) 2016 with „Personal electromyographic biofeedback system - MyMyo“ poster
- Rector's Award, 2015 - for work on project titled "Audio phonebook for the blind people" (with colleague Goran Popović)
- BEST Engineering Competition (Team Design category), 2013 - European competition in designing and constructing a prototype which fulfills task's requirements within a limited amount of time and material. Won 6. place in finals.
- Dean's Award "Josip Lončar", 2012 - for outstanding performance in the 2<sup>nd</sup> year of undergraduate, University of Zagreb
- Scholarships
  - The "City of Zagreb" University Scholarship (2013 – 2016)
  - "Internship Programme of German Business for the Countries of the Western Balkans" foundation scholarship (2015)
  - DAAD scholarship for German language summer course (2014)
  - The "City of Zagreb" High School Scholarship (2009 – 2013)
- International Young Physicists Tournament (IYPT), Teheran, Iran, 2011, bronze medal
- International Young Physicists Tournament (IYPT), Vienna, Austria, 2010, bronze medal

## TEACHING EXPERIENCE

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- 02/2018 – present      Mentoring bachelor and master students as well as teaching assistant at the EPFL, Lausanne
- 07/2013                    Workshop leader at "Summer Science Factory 2013", Samobor, Croatia ("Electromagnetic Fellowship" for 7th and 8th grade of primary school)
- 09/2012 – 09/2014      Student assistant for various courses at the Faculty of electrical engineering and computing, University of Zagreb, Croatia
- 07/2012                    Workshop leader at "Summer School of Science S3 + +" 2012th ("Shape memory alloy robotic arm" for students 3rd and 4th year of high school)
- 10/2011 – 05/2012      Mentor to students at the National Competition in Physics for experimental work with the work: "The properties of Nitinol springs and manufacture of robotic arm"

## ADDITIONAL EDUCATION AND COURSES

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- 08/2014                    **German language course, B2**  
German Courses Passau, Passau, Germany
- 09/2000 – 07/2012      **Music school**  
Music High School "Vatroslav Lisinski" - instrument Harp (2009 – 2012), Clarinet (2008 – 2012)  
Music Primary School „Ivan Zajc“ – instrument Piano (2000 – 2007)

## PERSONAL SKILLS

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| Job-related skills | <ul style="list-style-type: none"> <li>- versatility, persistence, attention to details, reliability and curiosity for research</li> <li>- ability to work in multicultural environments, gained through international camps and international competitions</li> <li>- experience as a team leader in Croatian PhD student association "Penkala" (2018 – present)</li> <li>- organization skills through leading of "Youth research center" student organization (2012-2016), and Croatian selection for International Young Naturalists' Tournament (2014 – 2018)</li> <li>- languages knowledge: English C1, German B2, French B1</li> </ul> |
| Computer skills    | <ul style="list-style-type: none"> <li>- good knowledge and experience with: Matlab, Python, C, Solidworks, Altium</li> <li>- intermediary knowledge of: Java and Android Studio, C++</li> <li>- good grasp of signal and image processing algorithms</li> <li>- significant experience with biomedical signal processing and analysis</li> <li>- experience with machine learning algorithms and hyperdimensional computing</li> <li>- projects with microcontrollers programming and PCB design (Arduino, MSP430, Stellaris...)</li> </ul>   |
| Hobbies            | <ul style="list-style-type: none"> <li>- climbing, hiking, ski touring, salsa</li> <li>- photography, painting, piano, clarinet, harp</li> </ul>   |