

UNA PALE

"Electrical engineer doing data science for biomedical applications, passionate about open science, science for society and projects that make difference."

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1992, Croatia

ACADEMIC EDUCATION

- 07/2023 – Present **Postdoctoral researcher** at EPFL, Lausanne, Switzerland
- 02/2018 – 07/2023 **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)

WORK EXPERIENCE

- 12/2018 – Present **NGO Penkala – Croatian Association of Young Scientists**
Board member, project leader and manager
Leading the association, funding applications, deciding on the main plans, activities and future directions. Working on building Croatian scientific network and providing additional education for Croatian scientists.
- 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 was 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.

PROJECTS

Non-scientific projects:

- "Science and Policy Summer School", 2022 - Present
- "Istražilica" istrazilica.hr, 2022 - Present
- Map of Croatian Scientists, 2022 - Present
- Podcast "Slušalica", 2018 - Present
- International competition IYNT, 2014-2018
- "Youth Research Center" NGO, 2012 - 2016
- Initiator and coorganizer of PhD summer school funded by EPFL/ETHZ, <https://scienceandpolicy2023.epfl.ch/>
- Initiator and working on creating Web platform for scientific opportunities for young Croatian scientists, project in the scope of NFO Penkala
- Initiator and working on creating Web platform with a map of Croatian scientists, project in the scope of NGO Penkala
- Starting the first Croatian scientific podcast, host of many episodes
- Coorganizing Croatian selection for the International Young Naturalists' Tournament, helping students in solving scientific problems and preparation for the competition
- Leading student organization, ensuring funding, organizing workshops and competitions

Scientific projects:

- Project
09/2016 – 08/2017
 - *Nadi shodana breathing technique's influence on autonomic nervous system*
Research on how does yoga breathing technique “Nadi shodana” affects on autonomic nervous, conducted at the University Hospital Centre in Zagreb, Croatia.
- MSc thesis
03/2016 – 09/2016
 - *Electromyographic biofeedback system*
Design, construction and testing of a compact-size, wireless (BLE) and surface EMG measurement system for physiotherapy, with developed Android application (Java) for user interface.
- Graduate project
09/2015 – 02/2016
 - *Contactless assessment of HR using Eulerian video magnification*
Eulerian video magnification applied to video recordings of palpation sites of human for contactless heart rate (HR) and pulse transit time (PTT) assessment. Project was done at Technical University of Vienna, Austria.
- Project
09/2015 – 11/2016
 - *Heart rate variability analysis using wavelet transform*
Assessment of three methods of wavelet transform for heart rate variability (HRV) extraction from HR signal. Project was done at Technical University of Vienna, Austria.
- BSc thesis
03/2014 – 07/2014
 - *Modeling of bee's movements in a biohybrid simulator*
Developing two models of bees' behaviour and movement in a field with a temperature gradient.
- Project
10/2013 – 02/2014
 - *Coordinated control of autonomous quadcopter and mobile robots*
Drone image processing for detection and localization of mobile robots in arena for rescue missions.

SCIENTIFIC PAPERS AND CONFERENCES

- U. Pale, T. Teijeiro, S. Rheims, P. Rylvlin, and D. Atienza, “Combining General and Personalized Models for Epilepsy Detection with Hyperdimensional Computing”, arXiv
- U. Pale, T. Teijeiro, and D. Atienza, “Importance of methodological choices in data manipulation for validating epileptic seizure detection models”, arXiv:2302.10672
- U. Pale, T. Teijeiro, and D. Atienza, “ExG Signal Feature Selection Using Hyperdimensional Computing Encoding”, BIBM 2022
- R. Zanetti, U. Pale, T. Teijeiro, and D. Atienza, “Approximate zero-crossing: a new interpretable, highly discriminative and low-complexity feature for EEG and iEEG seizure detection”, Journal of Neural Engineering, 2022
- W.Simon, U.Pale, T. Teijeiro, and D. Atienza, “HDTorch: Accelerating Hyperdimensional Computing with GP-GPUs for Design Space Exploration”, ICCAD 2022
- U. Pale, T. Teijeiro, and D. Atienza, “Exploration of Hyperdimensional Computing Strategies for Enhanced Learning on Epileptic Seizure Detection”, EMBC 2022
- U. Pale, T. Teijeiro, and D. Atienza, “Multi-Centroid Hyperdimensional Computing Approach for Epileptic Seizure Detection”, Frontiers in Neurology
- 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

- 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“
- Rector's Award, 2015 - for work on project titled “Audio phonebook for the blind people”

- 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 2nd 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

- 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)

ADDITIONAL EDUCATION AND COURSES

- 09/2022 – 01/2023 **Innosuisse Startup Training**
Business Concept training at EPFL Innovation Park
- 2019 - Present **French language course, EPFL, B1-2**
- 08/2014 **German language course, B1-2**
German Courses Passau, Passau, Germany
- 09/2000 – 07/2012 **Music school**
Music High School "Vatroslav Lisinski" - instrument Harp and Clarinet
Music Primary School „Ivan Zajc“ – instrument Piano (2000 – 2007)

PERSONAL SKILLS

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|--------------------|---|
| Job-related skills | <ul style="list-style-type: none"> - versatility, persistence, attention to details, reliability and curiosity for research - ability to work in multicultural environments, challenging social situations etc. - experience as a leader in Croatian Young scientists student association "Penkala" (2018 – present) - organization skills through leading of "Youth research center" student organization (2012-2016), and Croatian selection for International Young Naturalists' Tournament (2014 – 2018) as well as many events in scope of "Penkala" - language knowledge: English C1, German B1-2, French B1 |
| Computer skills | <ul style="list-style-type: none"> - good knowledge and experience with: Matlab, Python, C, Solidworks, Altium - lots of experience with various machine learning algorithms especially hyperdimensional computing - good grasp of signal and image processing algorithms, especially biomedical signals - intermediary knowledge of: Java and Android Studio, C++ - projects with microcontrollers programming and PCB design (Arduino, MSP430, Stellaris...) |
| Hobbies | <ul style="list-style-type: none"> - basic experience in website development, podcasts recording and video processing - outdoor oriented person, climbing, hiking, ski touring - had musically oriented childhood by playing piano, clarinet and harp - now more oriented on photography, painting and DIY things - recently deep dived into effective altruism |