



## Curriculum Vitae

# Petar Jerčić

Place of living : Split, Croatia  
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## Healthcare Scientist, Serious Games Designer and Developer, Software Engineer, System Architect, Lecturer

International healthcare researcher and software engineer in Serious Games with experience in entrepreneurship, academia and industry making groundbreaking medical software using human physiology and affect. Major focus includes System Architecture, Data Analysis, Game Design and Development for supporting Decision-making based on Emotion-regulation. Key strengths are Analytical Skills, Research Design, Outcomes Evaluation, Lecturing, Scientific Writing, and Cross-platform Software Development. Motivated by developing quality assurance and cutting-edge applications with particular interest in real-time systems, working independently or managing teams using agile methods in development cycle.

### Key Skills

- C++11 and C++14 standards
- Python, C#, Java
- Matlab, R
- Qt 5, Unity 3D, DirectX and OpenGL
- CMake Build System
- STL, Boost and open source libraries
- Google Test
- Agile development processes

### Education

- **Ph.D. in Computer Science**, Blekinge Institute of Technology (Sweden)  
**Research focus:** Game Development and Design  
**Ph.D. thesis:** The Effects of Emotions and Their Regulation on Decision-making Performance in Affective Serious Games
- **M.Sc. in Computer Science**, University of Split (Croatia)  
**MS thesis:** Business layer logic in information system for job applications

### Working experience

- 1/2019 - Present **Senior Lecturer**  
**Blekinge Institute of Technology, Karlskrona (Sweden)**
- Course responsible for research methodology courses in higher education
  - Course responsible and supervision for bachelor theses in Computer Science
  - Master thesis supervision in computer science
- 10/2016 - 12/2018 **R&D Software Designer**  
**Philips Healthcare, Best (Netherlands)**

- Development of X-ray systems in the area of cardiac or vascular medical diagnosis and intervention (i.e., a “dotter” treatment)
- Requirements design, development, testing and integration of software units related to imaging system and user interface
- Development of the user interface for the low level control for the movement to combine (high speed) motion with safety for the patient and the operator
- Working in Agile Scrum Team employing Lean Software development practices
- Following the Software Documentation Process ISO 13485 standard for Software Development for Medical devices - Class III (IEC 60601)
- Tooling: C++ 11, Qt5, CMake, Google Test

**01/2015 - 09/2016**     **Researcher and Developer of Physiology sensors for Hearing Aid (*PhD related*)  
The School of Medicine, Split (Croatia)**

*Research Fellowships for professional development of young researchers and postdoctoral researchers in the field of medical neuroelectronics [EU project]*

- Development of physiology sensors and experiments for the use of fundamental investigation of neurobiology in the human hearing
- Development of the neuroelectronic software interface based on electroencephalograph (EEG) sampled at high frequency (> 20 kHz)
- Development of the artifact removal algorithm for the cochlear implants on EEG signals using Independent Component Analysis (ICA)
- Tooling: MATLAB.

**01/2014 - 05/2014**     **Robotic system developer (*PhD related*)  
RIKEN Brain Science Institute (RIKEN BSI), Tokyo (Japan)**

- Development of robotic technologies communicating with physiological sensor technologies (i.e., EEG and Microsoft Kinect)
- Collaborative interaction between human and robot
- System architect and software engineer, knowledge and technology transfer
- Tooling: C/C++, Python, MATLAB.

**04/2013 - 06/2013**     **Brain-Computer Interface (BCI) developer (*PhD related*)  
Radboud University, Nijmegen (Netherlands)**

- Development of Brain-Computer Interface (BCI) technologies using Serious Games as training tools, which use EEG medical sensor to extract information on various brain states
- Used wearable EEG device and Serious games allowing convenience and short setup times
- System architect and software engineer, knowledge and technology transfer
- Demonstration at Europeans Researcher Night 2014 for popularization of science
- Tooling: C/C++, C#, MATLAB

**06/2012 - 09/2013**     **Researcher and Developer of Dynamic Robotic Systems (*PhD related*)  
Blekinge Institute of Technology, Karlskrona (Sweden)**

*PsyIntEC [EU project]*

- Advances that address safe ergonomic and empathetic adaptation by a robotic system to the needs and characteristics of a human co-worker during collaborative work in a joint human-robot work cell
- Psychophysiological (or biometric) data input (i.e., ECG, EEG and GSR) as the basis for affective and cognitive modelling of the human partner as a basis for behavioral adaptation

- Project proposal, managing publishing and reporting research
- System architect and software engineer
- Tooling: C/C++, C#, Java, MATLAB.

**03/2010 - 09/2012**     **Researcher and Developer of Serious Game Technologies (*PhD related*)**  
**Blekinge Institute of Technology, Karlskrona (Sweden)**

*xDelia [EU project]*

- Improving financial decision making by developing and evaluating the potential of serious games and medical sensors
- Development of tools to conduct experimental and field research, medical instrumentation and serious games
- The importance for competence building of contextual and psychological validity, and of the need for timely and relevant feedback
- Biofeedback using Serious games and medical sensors (i.e., ECG, EEG and GSR)
- Managing publishing and reporting research
- Knowledge transfer
- Tooling: C/C++, Unity 3D, C#, Java, MATLAB, DirectX, OpenGL

**03/2009 - 01/2010**     **Systems architect and developer (*Fulltime job*)**  
**FESB (Lama d.o.o.), Split (Croatia)**

- Development of IPNAS (Intelligent Surveillance System Against Fire) system
- A series of cameras monitoring certain area for potential fire threat
- Framework for communication between cameras and the servers in Unix
- Image processing and analysis using Gauss MM
- Tooling: C/C++, OpenCV, JavaScript, PHP, HTML

**08/2008 - 09/2008**     **C# and SQL developer (*ISE program*)**  
**Ghent University (UGent), Ghent (Belgium)**

- Development of software solution for simulating flow and behavior of refrigerants in heat exchangers
- Mechanical engineering department
- User interface
- Tooling: C, C#, SQL

**01/2008 - 05/2008**     **Fortran and Matlab Developer (*ISE program*)**  
**University of Michigan (UMICH), Ann Arbor (United States)**

- Development of Design Optimization software for application in car design
- Mechanical engineering department
- Optimization algorithms framework ,visualization of data
- Tooling: C/C++, FORTRAN, MATLAB.

**09/2007 - 01/2009**     **Web developer (*Parttime job*)**  
**Internet partner (Booking IT), Split (Croatia)**

- Development of Hotel Booking System and Accommodation Booking portal
- Microsoft .NET technology
- Tooling: VB.NET, SQL, JavaScript, PHP, HTML

## Languages

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- English (fluent)
- Swedish (intermediate)
- Japanese (intermediate)
- Croatian

## Publications

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DOCTORAL THESIS - The Effects of Emotions and Their Regulation on Decision-making Performance in Affective Serious Games, *Blekinge Institute of Technology, Karlskrona (Sweden)*, on April 2019., supervisor: Veronica Sundstedt

LICENTIATE THESIS - DESIGN AND EVALUATION OF AFFECTIVE SERIOUS GAMES FOR EMOTION REGULATION TRAINING (at Blekinge Institute of Technology, Karlskrona (Sweden), April 2013., supervisor: Stefan Johansson)

Jerčić P., Sundstedt V., (2019). PRACTICING EMOTION-REGULATION THROUGH BIOFEEDBACK ON THE DECISION-MAKING PERFORMANCE IN THE CONTEXT OF SERIOUS GAMES: A SYSTEMATIC REVIEW, *Entertainment Computing*, Elsevier.

Jerčić, P., Sennersten, C., Lindley, C. (2018). MODELING COGNITIVE LOAD AND PHYSIOLOGICAL AROUSAL THROUGH PUPIL DIAMETER AND HEART RATE. *Multimedia Tools and Applications*, 1-15.

Jerčić, P., Hagelbäck, J., Lindley, C. (2018). PHYSIOLOGICAL AFFECT AND PERFORMANCE IN A COLLABORATIVE SERIOUS GAME BETWEEN HUMANS AND AN AUTONOMOUS ROBOT. In: Clua E., Roque L., Lugmayr A., Tuomi P. (eds) *Entertainment Computing – ICEC 2018*. Lecture Notes in Computer Science, vol 11112. Springer, Cham

Jerčić P., Wen W., Hagelbäck J., Sundstedt V., THE EFFECT OF EMOTIONS AND SOCIAL BEHAVIOR ON PERFORMANCE IN A COLLABORATIVE SERIOUS GAME BETWEEN HUMANS AND AUTONOMOUS ROBOTS, *International Journal of Social Robotics*, pp. 1–15.

Jerčić, P., Astor, P. J., Adam, M., Hilborn, O., Schaff, K., Lindley, C. A., Sennersten, C., et al. (2012). A SERIOUS GAME USING PHYSIOLOGICAL INTERFACES FOR EMOTION REGULATION TRAINING IN THE CONTEXT OF FINANCIAL DECISION MAKING. *ECIS 2012 Proceedings*. AIS Electronic Library (AISeL).

Jerčić P., Sennersten C., Lindley C., THE EFFECT OF COGNITIVE LOAD ON PHYSIOLOGICAL AROUSAL IN A DECISION-MAKING SERIOUS GAME, in *IEEE Virtual Worlds and Games for Serious Applications (VS-Games), 2017 9th International Conference on, 2017, pp. 153–156*.

Adam M. T. P., Astor P. J., Jerčić P., Schaaff K. (2013). INTEGRATING BIOSIGNALS INTO INFORMATION SYSTEMS: A NEUROIS TOOL FOR IMPROVING EMOTION REGULATION. *The Journal of Management Information Systems*.

Jerčić, P., Cederholm H. (2010). THE FUTURE OF BRAIN-COMPUTER INTERFACE FOR GAMES AND INTERACTION DESIGN. Biosplay workshop at *Fun and Games Conference 2010*.

M. Horvat, M. Dobrinčić, M. Novosel and P. Jerčić (2018) ASSESSING EMOTIONAL RESPONSES INDUCED IN VIRTUAL REALITY USING A CONSUMER EEG HEADSET: A PRELIMINARY REPORT, *41st International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO), Opatija, 2018, pp. 1006-1010*.

Sohaib A.T., Qureshi S., Hagelbäck J., Hilborn O., Jerčić P. (2013). EVALUATING CLASSIFIERS FOR EMOTION RECOGNITION USING EEG. *15th International Conference on Human-Computer Interaction*.

Peffer G., Cederholm H., Clough G., Jerčić P. (2010). EVALUATING GAMES DESIGNED TO IMPROVE FINANCIAL CAPABILITY. *ECEL 2010 9th European Conference on e-Learning*.

Hagelbäck J., Hilborn O., Jerčić P., Johansson S. J., Lindley C. A., Svensson J, Wen W. (2013). PSYCHOPHYSIOLOGICAL INTERACTION AND EMPATHIC COGNITION FOR HUMAN-ROBOT COOPERATIVE WORK (PSYINTEC). *Gearing Up and Accelerating Cross-Fertilization between Academic and Industrial Robotics Research in Europe, Springer Tracts in Advanced Robotics 94*.

Hilborn O., Eriksson J., Jerčić P., Lindley C., Petersson J., Sennersten C., A STUDY OF THE EFFECT OF EMOTION REGULATION IN A SHOOTING GAME USING BIO-FEEDBACK FROM ELECTROENCEPHALOGRAPHY FOR TRAINING IN EMOTION REGULATION, *A Serious Game for Training in Emotion Regulation*, p. 79.

## Awards and Honors

- The Honorary Mention Best Paper Award, IFIP-ICEC 'Entertainment Computing' 2018

## Lecturing experience

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### **Blekinge Institute of Technology (Sweden)**

- Introduction to Programming, School of Computing, 2010-13
- 3D Programming, School of Computing, 2010-14
- Advanced 3D Programming, School of Computing, 2010-14
- Game and Interaction Design, School of Computing, 2013-14
- Student Game Projects, School of Computing, 2013-14
- Research Methodology (Course Responsible), Department of Computer Science, 2018-19
- Data Visualization, Department of Computer Science, 2018-19
- Bachelor Thesis in Computer Science (Course Responsible, Supervision) BTH 2013-19
- Supervision of bachelor and master theses in Computer Science, Game Development and Technical Artist program (BTH) 2013-19
- Master Thesis in Computer Science (Supervision) 2019
- Certified on three Higher Education Pedagogy courses bearing 22.5 ECTS points

### **Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture, Split (Croatia)**

- Introduction to Programming, Department of Computing, 2008-09
- Programming for Web, Department of Computing, 2008-09

## Sound media art projects

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### **06/2017 4. Sound Art Incubator**

#### **Kontejner (Zagreb, Croatia)**

The goal of this project is to use sounds to raise awareness of 'being in the moment'. This is achieved through breaking the repetitive and expected patterns in listening to music, through the introduction of random movement in both harmony and rhythm without repetitions. I am inviting the audience to actively pay attention and listen to (controlled) random/unpredictable sounds and music in each moment of these compositions, which is free of repetitive and expected patterns. Therefore, there is no opportunity to relive already learned musical elements and plan for the future development of the compositions. The audience can only be in the moment with sounds and music as they develop, being aware.

### **09/2016 Barcelona brain, cognition and technology summer school**

#### **University of Pompeu Fabra (Barcelona, Spain)**

Sonification of interactive behavior in robots and intelligent spaces. Nowadays a parametric and deliberately manipulation of sound diffusion in the acoustic space is a well-know possibility to listen to music in a theatre, cinema or living room. It is something similar to widespread technology surround 5.1. Different from this canonical system, our proposal is to setup an eight speakers system (octophonic field) to investigate how the listener's perception behaves when virtual sound sources are presented and manipulated. That is, our goal is to immerse the listener into a sound projection created by audible sound trajectories.

## Other

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Music (guitar), free climbing