

## **Cristian Axenie, Dr. Eng.**

*Curriculum Vitae*



### **Contact**

Web: <https://neurorobotics.me>

Email: [cristian.axenie@gmail.com](mailto:cristian.axenie@gmail.com)

### **Employment**

#### **Senior Research Engineer**

Artificial Intelligence and Machine Learning in Big Data Analytics  
Huawei German Research Center, Germany (Full-time, 34h/week)

since **1/04/2017**

#### **Head of Laboratory / Principal Investigator**

Artificial Intelligence and Machine Learning for Virtual Reality Applications  
AUDI Konfuzius-Institut Ingolstadt Lab, Germany (Part-time, 6 h/week)

since **1/10/2017**

#### **Lecturer**

Artificial Intelligence and Machine Learning  
Technische Hochschule Ingolstadt, Germany (per term basis)

since **1/10/2017**

#### **Consultant for startup companies**

Applied Artificial Intelligence and Machine Learning (per contract basis)

since **2016**

#### **Software Engineer**

Embedded Linux Development  
WindRiver (an Intel Corp.), Galați, Romania (Full-time, 40 h/week)

**1/07/2009 – 31/08/2011**

#### **Software Engineer (intern)**

Multi-core Digital Signal Processors (DSP)  
Freescale Semiconductor (NXP), Bucharest, Romania (Full-time)

**1/07/2008 – 1/10/2008**

### **Education**

#### **Postdoctoral Researcher**

Neuroscientific System Theory Group  
Neuroengineering Competence Center  
Technische Universität München, Germany (Part-time)

**1/05/2016 – 31/03/2017**

#### **Doctor of Engineering (Dr. Eng.)**

Neuroscience and Robotics (**Summa cum Laude**)

Technische Universität München, Germany

**1/10/2011 – 30/04/2016**

Advisor: Prof. Dr. Jorg Conradt (KTH Stockholm) (Part-time + Scholarship)

### **Master of Science (M.Sc.)**

Advanced Control Engineering and Robotics (**top 1%**)

Electrical and Electronics Engineering Faculty,

Dunărea de Jos University (UGAL), Galați, Romania

**1/10/2009 – 30/06/2011**

Advisor: Prof. Dr. Razvan Solea (University of Galați) (Full-time + Scholarship)

### **Bachelor of Science (B.Sc.)**

Automation and Industrial Informatics (**top 1%**)

Computer Science Faculty,

Dunărea de Jos University (UGAL), Galați, Romania

**1/10/2005 – 30/06/2009**

Advisor: Prof. Dr. Alexandru Stancu (University of Manchester) (Full-time + Scholarship)

### **Baccalaureat**

Mathematics and Informatics

National College Mihail Kogălniceanu, Galați, Romania (Full-time)

**15/9/2001 – 31/07/2005**

## **Research Grants**

**Project Leader in PERSEUS** (Platform for Enhanced Reality in Sport Exercise Understanding and Simulation) Project with a budget of **175000 EUR** within the **Zentrales Innovationsprogramm Mittelstand** (Central Innovation Programme for small and medium-sized enterprises) of the **Bundesministerium für Wirtschaft und Energie** (Federal Ministry for Economic Affairs and Energy).

**09/2019 – 04/2021**

## **Fellowships**

**Awarded a BayIntAn Fellowship (5000 EUR)** from **Bavarian Research Alliance** for establishing a cooperation on the development of a platform for neuromorphic sensorimotor adaptation with **ETH Zurich** and **University of California, Irvine**.

**01/2017**

**Awarded a BayIntAn Fellowship (10000EUR)** by the **Bavarian Research Alliance** for establishing a cooperation on neurorobotics with **University of Waterloo, Canada** and the **University of Manchester, UK**.

**07/2016**

**Awarded a Leonhard Lorenz-Stiftung Fellowship (7000EUR)** at **Technische Universität München** for novel ideas in neurotechnologies research.

**04/2013**

**Awarded Research Fellowship (2500EUR)** by the **Science Network of Biomimetic and Biohybrid Systems** for leading a workgroup at the **CapoCaccia Cognitive Neuromorphic Engineering Workshop, Italy**.

**05/2013**

**Awarded Research Fellowship (2500EUR)** by the **Science Network of Biomimetic and Biohybrid Systems** for leading a workgroup at the **Telluride Neuromorphic Cognition Engineering Workshop, USA**.

**07/2013**

**Awarded a Bavarian Elite Research PhD Scholarship (4 years funding, ~120.000EUR)** by the **Bavarian Ministry of Sciences, Research and the Arts**.

**04/2012**

## Honors and awards

**1st place at the Merck AI Research Challenge (2500EUR)** for the development of IRENA (Invariant Representation Extraction in Neural Architectures) Artificial Intelligence System.  
<https://www.thi.de/suche/news/news/thi-erfolgreich-in-ai-forschungswettbewerb>

**08/2019**

### **Awarded a nVidia GPU Grant**

Neuromorphic Processing for Electric Autonomous Driving with Schanzer Racing Electric (SRE) project at Technical University of Ingolstadt.

**04/2018**

**Awarded Outstanding Reviewer Award** from **IOP Journal of Neural Engineering** **2016**

**Awarded 1st prize** at the **Daimler Automotive Big Data Analytics Hackaton** for the design of a neuro-fuzzy learning system for adaptive anomaly detection. **04/2016**

**Awarded the Microsoft Cognitive Technologies prize (500EUR)** at the **Burda Hackdays** for the development of a neural learning system for psychometric data analytics. **04/2016**

**Awarded 1st prize (5000EUR)** at the **BMW Automotive Hackdays** for the development of an artificial intelligence learning agent for predictive maintenance. **03/2016**

**Awarded 4th place** at the **National IBM “Best Linux Application”** programming contest for work in robot fault-tolerant control using custom embedded Linux. **09/2009**

**Awarded 1st prize** at the **13th International Scientific Sessions Polytechnic University of Timisoara**, Romania for work on nonlinear control for mobile robots. **05/2009**

**Awarded University of Galați Performance Scholarship** (100 EUR/month) **2006 - 2009**

## Selected publications

### *Journals*

#### *Biomedical Engineering, Artificial Intelligence*

1. D. Kurz, **C. Axenie**, Learning Personalized Virtual Reality Avatars for Chemotherapy-Induced Peripheral Neuropathy Rehabilitation in Breast Cancer, Deutsche Krebskongress (DKK) 2020, Oncology Research and Treatment, 43, Suppl. 1: 166. 2020.
2. **C. Axenie**, D. Kurz, Role of Kinematics Assessment and Multimodal Sensorimotor Training for Motion Deficits in Breast Cancer Chemotherapy-Induced Polyneuropathy: A Perspective on Virtual Reality Avatars, Frontiers in Oncology 2020 (*in Review*).
3. **C. Axenie** et al., Technological and Data-Driven Innovations in Cancer Care: status and recommendations resulting from international workshop series Tech4Cancer, JMIR Medical Informatics 2020. (*in Review*)

### *Artificial Intelligence, Neurobotics, Sensor Data Analytics*

4. F. Mirus, **C. Axenie**, T. C. Stewart, J. Conradt, Neuromorphic Sensorimotor Adaptation for Robotic Mobile Manipulation: From Sensing to Behaviour, Cognitive Systems Research, 2018.
5. I. Sugiarto, **C. Axenie**, J. Conradt, FPGA-based Hardware Accelerator for an Embedded Factor Graph with Configurable Optimization, ACM Journal of Circuits, Systems and Computers, 2018.
6. **C. Axenie**, J. Conradt, Cortically inspired sensor fusion network for mobile robot egomotion estimation, Robotics and Autonomous Systems, 2014.
7. I. Susnea, **C. Axenie**, Cognitive Maps for Indirect Coordination of Intelligent Agents, Studies in Informatics and Control Vol. 24, 2015.
8. **C. Axenie**, C. Richter, J. Conradt, A Self-Synthesis Approach to Perceptual Learning for Multisensory Fusion in Robotics, Sensors 16(10) 1751, 2017.

### **Conference Proceedings**

#### *Biomedical Engineering, Artificial Intelligence*

9. **C. Axenie**, D. Kurz, CHIMERA: Combining Mechanistic Models and Machine Learning for Personalized Chemotherapy and Surgery Sequencing in Breast Cancer, 20<sup>th</sup> IEEE International Conference on Bioinformatics and Bioengineering, BIBE2020 (*in Review*).
10. **C. Axenie**, D. Kurz, Tumor Characterization using Unsupervised Learning of Mathematical Relations within Histopathological Breast Cancer Data, 29th International Conference on Artificial Neural Networks, ICANN2020 (*in Review*).
11. **C. Axenie**, D. Kurz, GLUECK: Growth pattern Learning for Unsupervised Extraction of Cancer Kinetics, European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases 2020 (ECML-PKDD 2020).
12. **C. Axenie**, D. Kurz, PRINCESS: Prediction of Individual Breast Cancer Evolution to Surgical Size, IEEE 33<sup>rd</sup> International Symposium on Computer-Based Medical Systems, (CBMS20), Mayo Clinic, Rochester, US.
13. **C. Axenie**, D. Kurz, Adaptive Virtual Reality Avatars for Sensorimotor Rehabilitation in Chemotherapy-Induced Peripheral Neuropathy, 2020 Annual Meeting of the Multinational Association of Supportive Care in Cancer (MASCC2020).
14. **C. Axenie**, Armin Becher, Daria Kurz, Thomas Grauschopf, Meta-Learning for Avatar Kinematics Reconstruction in Virtual Reality Rehabilitation, IEEE International Conference on Bioinformatics and Bioengineering, BIBE2019.
15. C. S. Sanchez, J. Baumbach, S. Smyth, **C. Axenie**, Fuzzy Inference System for Risk Evaluation in Gestational Diabetes Mellitus, IEEE International Conference on Bioinformatics and Bioengineering, BIBE2019.

### *Artificial Intelligence, Neurobotics, Sensor Data Analytics*

16. Carlos Salort Sanchez, Alexander Wieder, Paolo Sottovia, Stefano Bortoli, Jan Baumbach, **C. Axenie**, GANNSTER: Graph-Augmented Neural Network Spatio-Temporal Reasoner for Traffic Forecasting, European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases 2020 (ECML-PKDD 2020) (*in Review*).
17. D. Xiaorui, Y. Erdem, I. Schweizer, **C. Axenie**, A Neural Framework for Learning Invariant Physical Relations in Multimodal Sensory Processing, 29th International Conference on Artificial Neural Networks, ICANN2020 (*in Review*).
18. **C. Axenie**, Radu Tudoran, Stefano Bortoli, Mohamad Al Hajj Hassan, Alexander Wieder, Goetz Brasche, SPICE: Streaming PCA fault Identification and Classification Engine in Predictive Maintenance, 2019 IoT Stream for Data Driven Predictive Maintenance Workshop, European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML PKDD 2019).
19. Sebastian Pohl, Armin Becher, Thomas Grauschopf, **C. Axenie**, Neural Network 3D Body Pose Tracking and Prediction for Motion-to-Photon Latency Compensation in Distributed Virtual Reality, 28th International Conference on Artificial Neural Networks, ICANN2019.
20. A. Becher, **C. Axenie**, T. Grauschopf, VIRTOOAIR: Virtual Reality TOOLbox for Avatar Intelligent Reconstruction, 2018 IEEE International Symposium on Mixed and Augmented Reality (ISMAR2018).

### *Artificial Intelligence, Machine Learning*

21. **C. Axenie**, Radu Tudoran, Stefano Bortoli, Mohamad Al Hajj Hassan, Goetz Brasche, Dimensionality Reduction for Low-latency High-throughput Fraud Detection on Datastreams, 2019 IEEE International Conference on Machine Learning and Applications (ICMLA2019).
22. Carlos Salort Sanchez, Radu Tudoran, Stefano Bortoli, Mohamad Al Hajj Hassan, Goetz Brasche, **C. Axenie**, An Online Incremental Clustering Framework for Real-Time Predictive Analytics on Datastreams, 2019 IEEE International Conference on Machine Learning and Applications (ICMLA2019).
23. **C. Axenie**, Radu Tudoran, Stefano Bortoli, Mohamad Al Hajj Hassan, Goetz Brasche, NARPCA: Neural Accumulate-Retract PCA for Low-latency High-throughput Processing on Datastreams, 28th International Conference on Artificial Neural Networks, ICANN2019.
24. **C. Axenie**, Radu Tudoran, Stefano Bortoli, Mohamad Al Hajj Hassan, Goetz Brasche, STARLORD: Sliding window Temporal Accumulate-Retract Learning for Online Reasoning on Datastreams, 2018 IEEE International Conference on Machine Learning and Applications (ICMLA2018).

## *Robotics, Sensor Data Analytics*

25. **C. Axenie**, Solea, R, Real time control design for mobile robot fault tolerant control. Introducing the ARTEMIC powered mobile robot, 2010 IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications, pages 7–13, 2010.
26. **C. Axenie**, Conradt, J, Learning Sensory Correlations for 3D Egomotion Estimation, Proc. of Conference on Biomimetic and Biohybrid Systems, pages 329–338, 2015. Springer.

## **Invited talks**

**Invited talk at Technische Universität München, Munich School of Engineering**, in the “World of Engineering” Lecture Series with the topic of Online Machine Learning.

**06/2019**

**Invited talk at Lions Club Salzburg** on Real-World AI and VR Applications.

**02/2019**

**Invited talk at Lions Club Ubersee Cyber** on AI and VR for the Future of Society.

**09/2018**

**Invited talk at the Institute for Cognitive System, TU Munich** on Online distributed streaming machine learning: Big Data, Fast Data, All Data.

**07/2017**

**Invited talk at Basecamp.AI Winter School, Vienna** in Neural Learning Algorithms.

**01/2017**

**Invited talk at TEDx - Calea Domneasca - Dare to leave a mark** in Galați, Romania on Artificial and Biological Intelligence: From Applications to Ethics.

**07/2017**

**Media coverage in Wired Magazine** about work on neuromorphic computation for visual rehabilitation at **Wellcome Trust Competition: Hack the Senses** in London, UK.

<https://www.wired.co.uk/article/how-to-hack-senses-see-sound>

**07/2016**

## **Professional service**

### **Program-committee member**

International Conference of Artificial Neural Networks (ICANN)	<b>2013, 2019, 2020</b>
International Symposium Computer Based Medical Systems (CBMS)	<b>2020</b>
European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML PKDD)	<b>2019, 2020</b>

### **Reviewer**

MDPI Sensor Journal, IOP Journal of Neural Engineering	<b>since 2016</b>
Frontiers in Robotics, Frontiers in Oncology	<b>since 2019</b>

**Advisory board / Consulting**

Soley GmbH, GoalPlay GmbH&Co.KG, UnternehmerTUM

**2016 - 2018**

**Professional societies**

IEEE, Computational Intelligence Society

**since 2007**

Free Software Foundation

**since 2012**

European Association for Cancer Research

**since 2020**

**Other skills**

Languages for humans: German(A), Italian(I), French(A), English(A), Romanian(N), Russian(B).

Languages for machines: C/C++ (A), Python (I), Java (A), Matlab (A), R (B).

\* Scale: B (basic), I (intermediate), A (advanced), N (native)