

Cristian Axenie, Dr. Ing. (Univ.)

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Web: <https://neurorobotics.me>

Employment

Senior Research Engineer

Artificial Intelligence and Machine Learning in Big Data Analytics
Huawei German Research Center, Germany

2017 - present

Head of Laboratory / Principal Investigator

Artificial Intelligence and Machine Learning for Virtual Reality
AUDI Konfuzius-Institut Ingolstadt, Germany

October 2017 - present

Lecturer

Artificial Intelligence and Machine Learning
Technische Hochschule Ingolstadt, Germany

October 2017 – present

Consultant for startup companies

Applied Artificial Intelligence and Machine Learning

2016 - present

Software Engineer

Embedded Linux Development
WindRiver (an Intel company), Galati, Romania

July 2009 - July 2011

Software Engineer (intern)

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

July - October 2008

Education

Postdoctoral Researcher

Neuroscientific System Theory Group
Neuroengineering Competence Center
Technische Universität München, Germany

May 2016 - April 2017

Doctor of Engineering (Dr. Eng. Univ.)

Neuroscience and Robotics (**Summa cum Laude**)
Synthesis of Distributed Cognitive Systems:
Interactive Computational Maps for Multisensory Fusion
Technische Universität München, Germany
Advisor: Prof. Dr. Jorg Conradt (KTH Stockholm)

October 2011 - April 2016

Master of Science (M.Sc.)

Advanced Control Engineering and Robotics (**top 1%**)
Electrical and Electronics Engineering Faculty,
Dunărea de Jos University (UGAL), Galați, Romania
Advisor: Prof. Dr. Razvan Solea (University of Galati)

October 2009 - June 2011

Bachelor of Science (B.Sc.)

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

Computer Science Faculty,

Dunărea de Jos University (UGAL), Galați, Romania

Advisor: Prof. Dr. Alexandru Stancu (University of Manchester)

October 2005 - June 2009

Teaching experience

University teaching

Lecturer

Artificial Intelligence and Machine Learning
Technische Hochschule Ingolstadt, Germany

WS 2017 - SS 2019

Instructor

Computational Neuroengineering Practical
Brain Computer Interface Robot Control
Technische Universität München, Germany

WS 2016

Teaching Assistant

Computational Intelligence
Technische Universität München, Germany

WS 2011 - WS 2016

Teaching Assistant

Sensors and Transducers
Dunărea de Jos University (UGAL), Galați, Romania

SS 2010, SS2011

Lecturer

Assembler Programming
Dunărea de Jos University (UGAL), Galați, Romania

WS2009, WS2010

Lecturer

Digital Signal Processing
Dunărea de Jos University (UGAL), Galați, Romania

WS2009, WS2010

Research Workshops

Workgroup leader

Multisensory Integration and Neuromorphic Control for Flying Robots
CapoCaccia Cognitive Neuromorphic Engineering Workshop
Sardinia, Italy

April 2013

Workgroup leader

Universal Neuromorphic Devices and Sensors for Real-Time Mobile Robotics
Telluride Neuromorphic Cognition Engineering Workshop
Telluride, USA

July 2013

Lecturer and Instructor

Neural Learning Algorithms
Basecamp.AI Winter School
Vienna, Austria

January 2017

Workgroup leader

Motor control using Cortico - Basal Ganglia model for Robot Arm reaching tasks
Nengo Summer School at University of Waterloo
Canada

June 2016

Lecturer and Instructor

Neuromorphic Vision Sensors and Event-based Information Processing for Robotics
IEEE CIS Summer School on Neuromorphic and Cyborg Intelligent Systems
Zhejiang University, China

September 2015

Student supervision

I have supervised over **30 students** at **Technische Universität München** between WS2011 and WS2016 on **Project Practical, Advanced Seminar, Bachelor and Master Theses**. Between 2017 and 2019 I have supervised **4 Bachelor theses and 1 Master thesis** at **Technische Hochschule Ingolstadt**.

Grants

Project Leader in Project **PERSEUS** (Platform for Enhanced Reality in Sport Exercise Understanding and Simulation) 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).
September 2019 – 30 April 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**.
January 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**.
July 2016

Awarded a Leonhard Lorenz-Stiftung Fellowship (7000EUR) at **Technische Universität München** for novel ideas in neurotechnologies research.
April 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**.
May 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. July 2013

Awarded a Bavarian Elite Research PhD Scholarship (4 years funding, ~120.000EUR) by the **Bavarian Ministry of Sciences, Research and the Arts**. April 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. August 2019

Awarded a nVidia GPU Grant
Neuromorphic Processing for Electric Autonomous Driving with Schanzer Racing Electric (SRE) project at Technical University of Ingolstadt. April 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. April 2016

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

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

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

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

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

Selected publications

1. D. Kurz, **C. Axenie**, Learning Personalized Virtual Reality Avatars for Chemotherapy-Induced Peripheral Neuropathy Rehabilitation in Breast Cancer, Deutsche Krebskongress (DKK) 2020.
2. **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).

3. 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).
4. **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.
5. 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.
6. **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, IoT Stream Workshop, European Conf. on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML PKDD 2019).
7. **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.
8. 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.
9. **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).
10. D. Feroni, **C. Axenie** et al., Moira: A Goal-Oriented Incremental Machine Learning Approach to Dynamic Resource Cost Estimation in Distributed Stream Processing Systems, International Workshop on Real-Time BI and Analytics, VLDB 2018.
11. A. Becher, **C. Axenie**, T. Grauschopf, VIRTOOAIR: Virtual Reality TOOLbox for Avatar Intelligent Reconstruction, 2018 IEEE International Symposium on Mixed and Augmented Reality (ISMAR2018).
12. I. Sugiarto, **C. Axenie**, J. Conradt, FPGA-based Hardware Accelerator for an Embedded Factor Graph with Configurable Optimization, Journal of Circuits, Systems and Computers, 2018.
13. F. Mirus, **C. Axenie**, T. C. Stewart, J. Conradt, Neuromorphic Sensorimotor Adaptation for Robotic Mobile Manipulation: From Sensing to Behaviour, Cognitive Systems Research, 2018.
14. **C. Axenie**, C. Richter, J. Conradt, A Self-Synthesis Approach to Perceptual Learning for Multisensory Fusion in Robotics, Sensors 16(10) 1751, 2017.
15. I. Sugiarto, **C. Axenie**, J. Conradt, From Adaptive Reasoning to Cognitive Factory:

Bringing Cognitive Intelligence to Manufacturing Technology, International Journal of Industrial Research and Applied Engineering, 2016.

16. **C. Axenie**, J. Conradt, Learning Sensory Correlations for 3D Egomotion Estimation, Springer LNCS in Biomimetic and Biohybrid Systems, pp. 329-338, 2015.
17. I. Susnea, **C. Axenie**, Cognitive Maps for Indirect Coordination of Intelligent Agents, Studies in Informatics and Control Vol. 24, 2015.
18. **C. Axenie**, J. Conradt, Cortically inspired sensor fusion network for mobile robot egomotion estimation, Robotics and Autonomous Systems, 2014.
19. **C. Axenie**, J. Conradt, Cortically Inspired Sensor Fusion Network for Mobile Robot Heading Estimation, Intl Conf. on Artificial Neural Networks, ICANN2013, pp. 240-47.
20. **C. Axenie**, R. Solea, Real time control design for mobile robot fault tolerant control. Introducing the ARTEMIC powered mobile robot, Mechatronics and Embedded Systems and Applications (MESA), 2010 IEEE/ASME Intl. Conf. on, 2010, pp. 7 -13.
21. **C. Axenie**, D. Cernega, Adaptive sliding mode controller design for mobile robot fault tolerant control, Robotics in Alpe-Adria-Danube Region (RAAD), 2010 IEEE 19th International Workshop on, 2010, pp. 253-59.

In review

2020

1. **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, Women's Cancer, 2020.
2. **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.
3. D. Xiaorui, Y. Erdem, I. Schweizer, **C. Axenie**, A Framework for Learning Invariant Physical Relations in Multimodal Sensory Processing, 2020 International Joint Conference on Neural Networks (IJCNN) within IEEE World Congress on Computational Intelligence (IEEE WCCI2020).
4. **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).

Patents

1. **C. Axenie**, Radu Tudoran, Stefano Bortoli, Mohamad Al Hajj Hassan, Goetz Brasche, Multi-Step Traffic Prediction System, 2019.

2. **C. Axenie**, Radu Tudoran, Stefano Bortoli, Mohamad Al Hajj Hassan, Goetz Brasche, Multisensory Learning System For Traffic Prediction, 2019.
3. **C. Axenie**, Radu Tudoran, Stefano Bortoli, Mohamad Al Hajj Hassan, Goetz Brasche, Automatic Model Selection for Timeseries Prediction on Data Streams, 2019.
4. Radu Tudoran, **C. Axenie**, Stefano Bortoli, Mohamad Al Hajj Hassan, Goetz Brasche, Online Traffic Controller with Spatio-Temporal Learning Extensions for Online Machine Learning Prediction, 2019.
5. Stefano Bortoli, Radu Tudoran, **C. Axenie**, Mohamad Al Hajj Hassan, Goetz Brasche, et al., DataBase-Embedded Streaming Engine, 2019.
6. Stefano Bortoli, Radu Tudoran, **C. Axenie**, Mohamad Al Hajj Hassan, Goetz Brasche, A System for Higher-Order Stream Processing, 2018.
7. **C. Axenie**, Radu Tudoran, Stefano Bortoli, Mohamad Al Hajj Hassan, Goetz Brasche, Streaming Random Forest, 2018.
8. **C. Axenie**, Radu Tudoran, Stefano Bortoli, Mohamad Al Hajj Hassan, Goetz Brasche, Stream Feature Extractor, 2017.

Invited presentations

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

June 2019

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

February 2019

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

September 2018

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

July 2017

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

January 2017

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

July 2017

Media coverage in **Wired Magazine** about work on neuromorphic computation for visual

rehabilitation at **Wellcome Trust Competition: Hack the Senses** in London, UK.

July 2016

Professional service

Organizer of the Artificial Reality Research and Cooperation Seminar

Technische Hochschule Ingolstadt (THI),
South China University of Technology (SCUT) and
Audi Konfuzius-Institute Ingolstadt.

February 2019

Program-committee member

International Conference of Artificial Neural Networks (ICANN)

2013 - 2019

Reviewer

MDPI Sensor Journal, IOP Journal of Neural Engineering

2016 - present

Advisory board / Consulting

Soley GmbH, GoalPlay GmbH&Co.KG, UnternehmerTUM

2016 - 2018

Professional development

Innovation Road-mapping for Emerging Technologies Certificate

Fraunhofer Institute for Systems and Innovation Research, Karlsruhe

June 2019

Deep Learning Expert Workshop Certificate

nVidia Deep Learning Institute, Munich, Germany

May 2017

Entrepreneurial Thinking Workshop Certificate (Prof. Breugst)

Entrepreneurship Research Institute, TUM Graduate School, Munich, Germany
December 2014

Effective Student Mentoring Workshop Certificate (Dr. Werther)

Münchner Institut für Systemische Weiterbildung (MISW)
Technische Universität München Graduate School, Munich, Germany

April 2014

Technical Writing Workshop Certificate (Prof. Diepold)

Technische Universität München Graduate School, Munich, Germany

October 2012

Designer certificate on dependable embedded systems analysis and design

University of Luzern (Switzerland) - Prof. Erich Styger.

September 2008

Professional societies

IEEE, Computational Intelligence Society
Free Software Foundation

as of 2007
as of 2012

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)

References

Prof. Jörg Conradt

KTH Stockholm, Sweden (conr@kth.se)
Research collaborator, former supervisor

Prof. Maarten De Vos

Oxford University, UK (maarten.devos@eng.ox.ac.uk)
Research collaborator

Prof. Giacomo Indiveri

ETH Zurich, Switzerland (giacomo@ini.uzh.ch)
Research collaborator

Prof. Timothy Constandinou

Imperial College London, UK (t.constandinou@imperial.ac.uk)
Research collaborator

Prof. Alexandru Stancu

Manchester University, UK (alexandru.stancu@manchester.ac.uk)
Research collaborator, former supervisor

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