

Ioana Giurgiu

Curriculum Vitae

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Address: AI for Services and Industry Research
Cognitive Computing and Industry Solutions
IBM Research - Zurich
Saumerstr. 4, CH-8803 Rueschlikon, Switzerland
Email: igi@zurich.ibm.com
Phone: +41 78 748 90 70
Nationality: Romanian
Permit: B

Research Interests

I am a **research scientist in Artificial Intelligence and Machine Learning**. My current research spans over several intersecting AI directions: **explainable and robust AI, multi-task learning, anomaly detection** and **predictive analytics** based on multivariate sensor temporal data. In all lines of work, my main focus is on **deep learning** methods. Depending on the use cases, in addition to a deep knowledge of AI and ML, domain knowledge – such as IT systems management – is essential. I am in the excellent position of having extensive systems and optimization expertise - acquired during my Ph. D. studies -, as well as deep machine learning and AI knowledge from having spent the last 6+ years focusing on this research domain at IBM Research - Zurich. My research work has been put into production and applied to hundreds of IBM customers.

Personal page at IBM: <https://resedit.watson.ibm.com/researcher/edit.php?person=zurich-IGI>

Experience

- Jul 2015 - Present **IBM Research Zurich, CH, Research Staff Member / Team Lead in AI/ML**
- Nov 2012 - Jun 2015 **IBM Research Zurich, CH, Postdoctoral Researcher in ML**
- Explainability for classification and anomaly detection models with a focus on multivariate time and event series data
 - Deep learning models (AEs, VAEs, LSTMs, GRUs) for performance anomaly detection from high-dimensional, multivariate sensor data
 - Real time event forecasting via time series and survival analysis for IBM POWER systems
 - Predictive analytics models for datacenter failures and performance degradation incidents
 - Root cause analysis of server (bare-metal, virtual machine) failures
 - ML-driven reconfiguration of relational database instances
- Oct 2008 - Sep 2012 **ETH Zurich, CH, Research Assistant**
- Advanced and optimal code distribution between modern mobile platforms and cloud systems
 - Scalable resource allocation system for complex applications in the cloud (in collaboration with IBM Watson Research Center, NY, USA)
 - Supervision of Bachelor and Master students
 - Publications of research results at top conferences
 - Teaching assistant for Bachelor and Master-level courses
- Jul 2011 - Oct 2011 **IBM Watson Research Lab, NY, USA, Research Intern**
- Optimization algorithms for cloud resource allocation of complex applications
 - Integration with IBM RC2 cloud platform
- Mar 2008 - Aug 2008 **DERI, Galway, Ireland, Research Intern**
- Jul 2007 - Sep 2007
- Design for semantic e-mail project (Semanta)
 - Developed semantic e-mail for Mozilla Thunderbird e-mail client
 - Integrated semantic e-mail in the EU Nepomuk project

Education

- Oct 2008 - Sep 2012 **PhD in Computer Science**, ETH Zurich, CH
Thesis: "Integrating Cloud Applications with Mobile Devices: Design Principles and Performance Optimizations"
Supervisors: Prof. Dr. Gustavo Alonso, Prof. Dr. Timothy Roscoe
- Oct 2003 - Jun 2008 **Engineering diploma**, Technical University, Cluj-Napoca, Romania
Grade: 9.84/10.00, Top of the class.

Engineering Skills

- *(Programming) languages*: python, R, Scala, Java, JavaScript, SQL
- *AI/ML/Data analytics tools/platforms*: Tensorflow, Keras, Pytorch, scikit-learn, pandas, numpy
- *Visualization*: matplotlib, seaborn, ggplot
- *Databases*: Oracle, IBM DB2, MySQL, PostgreSQL, Cassandra, Cloudant
- *Frameworks*: Hadoop, Apache Spark, IBM Bluemix, IBM IoT Platform
- *Operating systems*: Linux (preferred ubuntu / debian), Mac OS X, Windows

Publication Record

- 15+ publications in refereed international conferences
- H-index 9, 586 citations (as of March 2019)
- Relevant AI/ML conferences: KDD, AAAI, CIKM (highlighted under Selected Publications)
- Over 20 co-authors
- 1 Best Paper Award (CNSM 2013)
- 1 Runner up for Best Paper Award (DSN 2014)

IBM Awards

- 2016 Corporate Award for Predictive Analytics for Server Incident Reduction (PASIR)
– top 5 IBM projects in 2016
- 2017 Outstanding Technical Achievement Award for PASIR)

Fellowships and Grants

- 2011 Google Anita Borg Scholarship Finalist
- 2008-2012 Funding from Microsoft ICES (Innovation Cluster for Embedded Software)
- 2008-2012 Funding from NCCR-MICS (Mobile Information and Communication Systems)

Spoken Languages

- English: Fluent
- French: Intermediate speaking / writing level (B1)
- German: Basic toward average conversation / writing level
- Romanian: Native speaker

Patents

- US 14/135077 System recommendations based on incident analysis
- US 14/812069 Assisting database management

Selected Invited Talks

- *Explainable Failure Predictions with RNN Classifiers based on Time Series Data*, IBM T. J. Watson Research Lab, NYC, USA, 2019
- *Predictive Analytics for IT Infrastructure Management*, IBM Research - Australia, Melbourne, 2015
- *Integrating Cloud Applications with Mobile Devices*, IBM T. J. Watson Research Lab, NYC, USA, 2012
- *Mobile Devices as Gateways to Cloud Applications*, Microsoft Cambridge, UK, 2010

Selected Publications

- In preparation** *Deep Clustering for Multivariate Temporal Data*
I. Giurgiu, R. Assaf, A. Schumann
- In submission** *Spatio-temporal Explainable CNNs for Classification Tasks on Multivariate Time Series*
R. Assaf, A. Schumann, I. Giurgiu
- AAAI'19** *Explainable Failure Predictions with RNN Classifiers based on Time Series Data*
*workshop paper
I. Giurgiu, A. Schumann
- Middleware'17** *Predicting DRAM Reliability in the Field with Machine Learning*
I. Giurgiu, J. Szabo, D. Wiesmann, J. Bird
- SYSTOR'17** *"Memory Loss" in Commodity Hardware? Predicting DIMM Failures with Machine Learning*
I. Giurgiu, D. Wiesmann, J. Bird
- KDD'16** *Predicting Disk Replacements towards Reliable Data Centers*
M. Botezatu, I. Giurgiu, J. Bogojeska, D. Wiesmann
- CIKM'15** *Comprehensible Models for Reconfiguring Enterprise Relational Databases to Avoid Incidents*
I. Giurgiu, M. Botezatu and D. Wiesmann
- IM'15** *Do You Know How to Configure Your Enterprise Relational Database to Reduce Incidents?*
I. Giurgiu, A. Almasi and D. Wiesmann
- KDD'15** *Multi-View Incident Ticket Clustering for Optimal Ticket Dispatching*
M. Botezatu, J. Bogojeska, I. Giurgiu, H. Voelzer and D. Wiesmann
- NOMS'14** *Impact of HW and OS Type and Currency on Server Availability Derived from Problem Ticket Analysis*
J. Bogojeska, I. Giurgiu, D. Lanyi, G. Stark and D. Wiesmann
- DSN'14** *Failure Analysis of Virtual/Physical Machines: Patterns, Causes and Characteristics*
R. Birke, I. Giurgiu, L. Chen, D. Wiesmann and T. Engbersen
- CCGrid'14** *Analysis of Labor Efforts and Their Impact Factors to Solve Server Incidents in Data-centers*
I. Giurgiu, J. Bogojeska, S. Nikolaiev, G. Stark and D. Wiesmann
- CNSM'13** *Classifying Server Behavior and Predicting Impact of Modernization Actions*
J. Bogojeska, D. Lanyi, I. Giurgiu, G. Stark and D. Wiesmann
- Middleware'12** *Enabling Efficient Placement of Virtual Infrastructures in the Cloud*
I. Giurgiu, C. Castillo, A. Tantawi and M. Steinder
- Middleware'12** *Dynamic Software Deployment from Clouds to Mobile Devices*
I. Giurgiu, O. Riva and G. Alonso
- Middleware'09** *Calling the Cloud: Enabling Mobile Phones as Interfaces to Cloud Applications*
I. Giurgiu, O. Riva, D. Juric, I. Krivulev and G. Alonso

Google Scholar

<https://scholar.google.ch/citations?user=2NI-034AAAAJhl=deoi=ao>

References

Upon request