

Ilche Georgievski

Chief Technology Officer

Groningen, The Netherlands

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Summary

I am goal-oriented, detail-oriented, and organised. I have conducted extensive research and development in the field of automated planning and ubiquitous computing, with particular emphasis on Hierarchical Task Network (HTN) planning and energy efficient buildings. I have also performed research on the involvement of user behaviours in models and processes of automation for buildings. My contribution is the design and implementation of techniques for automation, starting from context processing, through service coordination, to orchestration. Currently, I am working in a young high-tech startup company whose mission is to make commercial buildings sustainable. Among other responsibilities, I am involved into finding ways of how to raise human awareness with respect to building energy consumption and environment conditions, and of how to control the lighting and heating systems of buildings intelligently and automatically.

My research interests include: HTN planning, domain knowledge acquisition and modelling, service coordination, orchestration, ubiquitous computing, cloud computing, Internet of Things.

The outcome of my research has led to several publications in highly reputable conferences and journals. In addition to my research in the field of computer science, I have performed research in collaboration with scientists from other fields, including behavioural sciences and industrial economics.

Experience

CTO, Sustainable Buildings, Groningen, The Netherlands

Since Apr 2017

Focus on scientific and technical issues, mainly on long-term and big-picture issues. Establish a technical strategy that is aligned with the company's business goals. Participate in writing customer proposals and customer meetings. Establish a software development process and coordinate a team of developers and operations involved in the process. Help individuals grow into technical leaders. Engage in seminars, conferences and other media activities.

Research scientist, Depart. of Computer Science, University of Groningen

Oct 2015-Mar 2017

Research on automation and cloud computing. Development of artificial intelligence planning and orchestrating techniques for energy smart cloud-based applications. Development of an interdisciplinary framework that establishes a relationship between automation and occupant behaviours in buildings. Teaching of the Master courses Distributed systems and Ubiquitous Computing (see [Teaching](#) below). Supervision of students in the context of Master thesis (see [Supervision/Advising](#) below).

Doctoral candidate, Depart. of Computer Science, University of Groningen

Jun 2011-Sep 2015

85% research on ubiquitous computing and automation for it. Development of the SH planner, an artificial intelligence planner based on hierarchical models suitable for office buildings. Development of orchestration and coordination techniques for building environments. 10% teaching of the Master course Distributed Systems (see [Teaching](#) below). 5% advising students in the context of Bachelor and Master theses (see [Supervision/Advising](#) below).

Scientific programmer, Depart. of Computer Science, University of Groningen

Sep 2010-May 2011

Research on artificial intelligence planning. Extended the JSHOP2 planner to handle phantomisation without knowledge provided explicitly in the domain. Implemented the algorithm of the RuGQoS'10 system for faster QoS-Aware web service composition. RuGQoS'10 participated in the Web Service Challenge 2010 (see [Scholarships and awards](#) below).

Software developer, SOA Competency and CC Center, Maribor, Slovenia

Dec 2009-Mar 2010

Development of Designed an innovative application architecture for patient healthcare using SOA and cloud computing principles. Implementation development of the architecture by using IBM WebSphere products. Leded group of students working on the project.

Education

- Ph.D., University of Groningen, The Netherlands** Jun 2011-Sep 2015
Computer science. Subject of the dissertation: [Coordinating services embedded everywhere via hierarchical planning](#). Supervisor: [Marco Aiello](#).
- uni.dipl.inž.rač. in inf. (Master's degree equal), University of Maribor, Slovenia** Oct 2005–May 2010
Final grade 9.62/10 **with honours**. General curriculum in computer and information science. Subject of dissertation: [Service-oriented architecture and cloud computing convergence](#). Supervisor: [Matjaž B. Jurič](#).

Scholarships and awards

- First and third place, Web Service Challenge** November 2010
RuGQoS'10 system [won](#) the third place in the Technical Challenge and first place in the Architectural Challenge.
- Zois Scholarship, Slovene Human Resources Development and Scholarship Fund** Oct 2009-Jun 2010
Awarded to **talented** students with outstanding results.
- State Scholarship, Slovenia** Oct 2006-Sep 2009
Awarded under a range of conditions, such as **study success** and study field.
- State Scholarship, Macedonia** Sep 2001-Jun 2005
Awarded to **talented** students.

Funding acquisition

- Proposal contributor and writer, Next Generation Building Management System** Amount: 10 K€
Funded by the Samenwerkingsverband Noord-Nederland under the Verneseller Innovatieve Ambitie (Accelerator Innovative Ambition) scheme
- Proposal contributor and writer, Efficient demand and supply matching by incentivizing end-users in buildings project** Amount: 1.4 M€
Funded by the Netherlands Research Organisation and SWEA the ERA-Net (H2020) Smart Grids Plus programme
- Proposal contributor and writer, Beijing Groningen Smart energy cities project** Amount: 0.3 M€
Funded by the Netherlands Research Organisation under JSTP Smart Energy in Smart Cities programme

Publications

Dissertations

- [1] **Coordinating services embedded everywhere via hierarchical planning**
Ilche Georgievski
Ph.D. dissertation, University of Groningen, Oct., 2015
- [2] **Service-oriented architecture and cloud computing convergence**
Ilche Georgievski
Diploma dissertation, University of Maribor, May, 2010

Books and edited proceedings

- [1] **5th IFIP WG 2.14 European Conference Service-Oriented and Cloud Computing**
Marco Aiello, Einar Broch Johnsen, Schahram Dustdar, Ilche Georgievski
Springer, 2016

Peer-reviewed journals

- [1] **Planning meets activity recognition: Service coordination for intelligent buildings**
Ilche Georgievski, Tuan Anh Nguyen, Faris Nizamic, Brian Setz, Alexander Lazovik, Marco Aiello
Pervasive and Mobile Computing 38, Part 1 (2017) pp. 110–139. Elsevier, 2017
- [2] **Automated planning for ubiquitous computing**
Ilche Georgievski, Marco Aiello
ACM Comput. Surv. 49.4 (2016) 63:1–63:46. ACM, 2016

- [3] **HTN planning: Overview, comparison, and beyond**
Ilche Georgievski, Marco Aiello
Artificial Intelligence 222 (2015) pp. 124–156. Elsevier, 2015
- [4] **Optimizing energy costs for offices connected to the smart grid**
Ilche Georgievski, Degeler Degeler, Guliano A. Pagani, Tuan A. Nguyen, Alexander Lazovik, Marco Aiello
IEEE Transactions on Smart Grid 3.4 (2012) pp. 2273–2285. 2012

Peer-reviewed conferences and workshops

- [1] **Mining Sequential Patterns for Appliance Usage Prediction**
Mathieu Kalksma, Brian Setz, Azkario Rizky Pratama, Ilche Georgievski, Aiello Marco
International Conference on Smart Cities and Green ICT Systems. 2018
- [2] **Cloud Ready Applications Composed via HTN Planning**
Ilche Georgievski, Faris Nizamic, Alexander Lazovik, Aiello Marco
IEEE International Conference on Service Oriented Computing and Applications. 2017
- [3] **Utility-based HTN planning**
Ilche Georgievski, Alexander Lazovik
European Conference on Artificial Intelligence, pp. 1013–1014. 2014
- [4] **Planning for coordination of devices in energy-smart environments**
Ilche Georgievski
Doctoral Consortium of the 23rd International Conference on Automated Planning and Scheduling. 2013
- [5] **Combining activity recognition and AI planning for energy-saving offices**
Ilche Georgievski, Tuan A. Nguyen, Marco Aiello
IEEE International Conference on Ubiquitous Intelligence and Computing, pp. 238–245. 2013
- [6] **Concept mapping for faster QoS-aware Web service composition**
Viktoriya Degeler, Ilche Georgievski, Alexander Lazovik, Marco Aiello
IEEE Conference on Service Oriented Computing and Applications, pp. 1–4. 2010

Technical reports and project deliverables

- [1] **An overview of hierarchical task network planning**
Ilche Georgievski, Marco Aiello
Tech. rep. CoRR, abs/1403.7426, 2014
- [2] **D2.2b: Service composition and orchestration**
Emiliano Binotti, Alessandro Ciarravano, Viktoriya Degeler, Ilche Georgievski
GreenerBuildings project deliverable. Mariano Leva, Massimo Mecella (eds.), 2013
- [3] **D3.1b: Distributed Architecture**
Silvia Bonomi, Mariano Leva, Massimo Mecella, Paul Shrubsole, Andrea Pagani, Viktoriya Degeler, Ilche Georgievski, Faris Nizamic, Marija Milenkovic, Ambes Hagos, Oliver Amft, Chun Yu Chen, José J Heras, Juan Pablo Viñuela, Manuel Ramiro, Manuel Fernandez, Gerardo Glorioso, Alessandro Ciarravano, Emiliano Binotti
GreenerBuildings project deliverable. Ilche Georgievski, Viktoriya Degeler, Alexander Lazovik (eds.), 2013
- [4] **Hierarchical planning definition language**
Ilche Georgievski
Tech. rep. University of Groningen, JBI 2013-12-3, 2013
- [5] **D2.1: Architecture design**
Silvia Bonomi, Mariano Leva, Massimo Mecella, Paul Shrubsole, Ilche Georgievski, Andrea Pagani, Viktoriya Degeler, Eirini Kaldeli, Marija Milenkovic, Ambes Hagos, Oliver Amft, José J Heras, Juan Pablo Viñuela, Manuel Ramiro, Manuel Fernandez, Alessandro Ciarravano, Emiliano Binotti
GreenerBuildings project deliverable. Viktoriya Degeler, Alexander Lazovik (eds.), 2012
- [6] **Optimizing offices for the smart grid**
Ilche Georgievski, Degeler Degeler, Guliano A. Pagani, Tuan A. Nguyen, Alexander Lazovik, Marco Aiello
Tech. rep. University of Groningen, JBI 2011-12-01, 2011
- [7] **Phantomization in an HTN Planner**
Ilche Georgievski, Alexander Lazovik, Marco Aiello
Tech. rep. CoRR, abs/1111.7025, 2011

Talks

- [1] **A Computer Science perspective on energy efficiency**
Environmental Psychology Master Course, Faculty of Psychology. Guest lecture, Groningen, The Netherlands. 26 April 2017
- [2] **Cloud Ready Applications Composed via HTN Planning**
SOCA 2017. Talk, Tokyo, Japan. 22-24 Nov 2017
- [3] **IoT Solutions for Sustainable Buildings**
IT ontwikkelingen voor de Energie-transitie. Talk, Amersfoort, The Netherlands. 29 June 2017
- [4] **Coordinating the Internet of Things: Turning buildings into intelligent spaces**
COVER Academic day 2016. Talk, Groningen, The Netherlands. 26 Feb 2016
- [5] **Energysense and distributed systems: ICT, data collection methods for field trials and privacy issues**
Workshop IEA-EBC Annex 70: Building Energy Epidemiology. Short talk, Paris, France. 9 May 2016
- [6] **HTN planning for the Cloud: Composing applications ready for deployment**
International Oberseminar on Foundations of Artificial Intelligence. Talk, Sassari, Italy. 26-28 May 2016
- [7] **Planning at the service of applications in service-oriented domains**
Netherlands Organisation for Applied Scientific Research (TNO). Talk, Groningen, The Netherlands. 10 Jan 2016
- [8] **Hierarchical planning revisited, applied, and experienced**
International Oberseminar on Foundations of Artificial Intelligence. Talk, Sabanci University, Turkey. April 2015
- [9] **Theory and practice of hierarchical planning**
International Oberseminar on Foundations of Artificial Intelligence. Poster, Sabanci University, Turkey. April 2015
- [10] **Theory and practice of hierarchical planning**
International Advisory Panel and the JBI board. Poster, University of Groningen, The Netherlands. January 2015
- [11] **Automated deployment of cloud services using AI planning**
Continuous Delivery Conference. Talk, Bussum, The Netherlands. 4 Dec 2014
- [12] **Combining Activity Recognition and AI Planning for Energy-Saving Offices**
UIC 2013. Talk, Vietri sul Mare, Italy. 18-20 Dec 2013
- [13] **Planning for coordination of devices in energy-smart environments**
ICAPS 2013. Poster, Rome, Italy. June 2013
- [14] **Planning for coordination of devices in energy-smart environments**
International Oberseminar on Foundations of Artificial Intelligence. Poster, University of Groningen, The Netherlands. May 2013
- [15] **An overview of hierarchical task network planning**
International Oberseminar on Foundations of Artificial Intelligence. Talk, Dagstuhl, Germany. May 2012
- [16] **Task interactions in HTN planners**
International Oberseminar on Foundations of Artificial Intelligence, Spoleto, Italy. April 2011

Editorial boards and chairing functions

Editorial board, [ERSICT](#)

Journal of Emerging Research and Solutions in ICT

Since 2016

Publication chair, [ESOCC](#)

European Conference on Service-Oriented and Cloud Computing

2016

Scientific program committee

PC member, APPIS 1st International Conference on Applications of Intelligent Systems	2018
PC member, ESOCC 7th European Conference on Service-Oriented and Cloud Computing	2017
PC member, SerCo Special Session on High Performance Services Computing and Internet Technologies (SerCo) at the International Conference on High Performance Computing & Simulation	2017

Reviewer invitations

Reviewer, ACM TIST ACM Transactions on Intelligent Systems and Technology	2017
Reviewer, ACM CSUR ACM Computing Surveys	2017
Reviewer, JACII Journal of of Advanced Computational Intelligence and Intelligent Informatics	2017
Reviewer, IEEE TSC IEEE Transactions on Service Computing	2016
Reviewer, JETAI Journal of Experimental & Theoretical Artificial Intelligence	2016
Reviewer, IEEE TSG IEEE Transactions on Smart Grid	2011, 2012, 2014
Sub-reviewer, scientific conferences CLOUD 2017, ICWS 2016, SASO 2016, ICWS 2015, CLOUD 2015, ICRA 2015, ESOCC 2015, AIIA 2015, WETICE 2015, CLOUDTECH 2015, WISE 2015, ICT Innovations 2015, CogMan 2015, CLOUD 2014, OPODIS 2014, SOCA 2013, CLOUD 2013, OPODIS 2013, SASO 2013, CoopIS 2013, SOCA 2012, ICSOC 2012, CLOUD 2012, CoopIS 2012, WISE 2012, WESOA 2012, GREENS 2012, PECCS 2011	2011-2017

Research dissemination

Interview, Sustainable Buildings Blog Geld besparen en de CO2-emissie verlagen; 'hoe mooi is dat!'	24 Aug 2017
Interview, Universiteitskrant Groningen Slim systeem bespaart bergen energie	9 Oct 2015
Interview, University of Groningen News Saving energy and money with smart systems	5 Oct 2015
Interview, Energy Valley Slimme systemen besparen energie en geld	5 Oct 2015
Interview, Online Video Magazine Unifocus Making offices even smarter	14 Nov 2012
Interview, University of Groningen, Faculty of Sciences and Engineering News 'Intelligent' offices bring down energy consumption	15 Oct 2012

Teaching

Course coordinator and lecturer, Net-Computing (in English) Bachelor course INBNC-08, University of Groningen.	Spring 2017
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Tutor , Introduction to Computing Science (in English) Bachelor course INBOI-08, University of Groningen.	Fall 2016
Lecturer , Distributed Systems (in English) Master course INMDSY-08, University of Groningen. Class taught jointly with Marco Aiello.	Fall 2012-2016
Lecturer , Ubiquitous computing (in English) Master course INMUBC-09, University of Groningen. Class taught jointly with Marco Aiello and Doina Bucur.	Fall 2015

Supervision/Advising

Master theses

Bas de Bruijn, [Discovering Features for a Smart Heating System](#), University of Groningen, August 2016. Daily supervisor (first supervisor [Alexander Lazovik](#)).

Xander Elsas, [Android Energy Management Application](#), University of Groningen, October 2014. Daily supervisor (first supervisor Marco Aiello).

Manuel Martiarena, [Tablet Interface for Smart Environments to Reduce Energy Consumption](#), University of Groningen, August 2012. Daily supervisor (first supervisor Marco Aiello).

Bachelor theses

Matijn Woudt, [An Interface for Managing Smart Office Environment](#), University of Groningen, December 2013. Daily supervisor (first supervisor Alexander Lazovik).

Angèle Croes, [Modeling a Planning Domain for Smart Offices](#), University of Groningen, August 2013. Daily supervisor (first supervisor Marco Aiello).

Jorrit de Boer, [Smart Offices: A Web-based Interface for Task Selection](#), University of Groningen, July 2013. Daily supervisor (first supervisor Marco Aiello).

Mark Hoekstra, [Web-based Interface for Domain Manipulation in Smart Offices](#), University of Groningen, July 2013. Daily advisor (first supervisor Marco Aiello).

Interns

Firat Sertgoz, Automated Management of Spark Jobs for processing energy data, Sustainable Buildings, April-July 2017. Supervisor.

Participation in projects

Project associate and system developer, BIGS, funded by the Netherlands Research Organisation (Smart Energy in Smart Cities) Oct 2015-Mar 2017

Scientific and technical participation in the development of a framework that integrates user behaviours, policies and ITC to reduce demand and promote smart use of energy across different cultures.

Project team member and system developer, GMA2, funded by the University of Groningen (Sustainability Initiative) Oct 2015-Dec 2017

Conceptual and technical participation in developing a solution that controls the heating of offices automatically and optimally.

Project team member and system developer, GMA, funded by the University of Groningen (Sustainability Initiative) Jan 2013-Jun 2014

Conceptual and technical participation in developing a solution that focuses on water conservation, waste recycling, smart reduction in electricity consumption and intelligent lighting.

Project associate and system developer, EnSO, funded by the Netherlands Research Organisation (Smart Energy Systems) Jun 2011-Dec 2015

Conceptual and technical participation in creating an energy-aware framework for offices that incorporates the building context and occupant activities to save energy automatically.

Project associate and system developer, GreenerBuildings, funded by the European Commission (7th Framework Programme) Sep 2010-Oct 2013

Software participation in developing an integrated solution for energy-aware adaptation of public buildings.

Courses

Networking skills, February 2016, HR Excellence in Research, University of Groningen, The Netherlands

Dutch for foreigners, A1-A2 Levels, Alfa-college, May 2013-June 2015, Groningen, The Netherlands.

Course on Computing for Data Analysis, Online, Johns Hopkins University, September-October 2013.

Course on Introduction to Interactive Programming in Python, Online, Rice University, August-October 2013.

Course on Artificial Intelligence Planning, Online, University of Edinburgh, January-March 2013.

Course on Functional Programming Principles in Scala, Online, EPFL, September-November 2012.

IJCAI International Summer School on Artificial Intelligence, Beijing, China, July 16-20 2012.

Training program on Writing Skills for Academics, University Centre for Learning & Teaching, University of Groningen, 2012 (7 days).

Course on Introduction to AI, Online, Stanford University, October-December 2011.

Non-academic activities

Web maintainer and editor of the Distributed Systems group's site, University of Groningen, The Netherlands 2011-2016

Member of Global Researchers Association for Science Popularization, Zurich, Switzerland Since 2016

Special knowledge and skills

Software engineering languages: Scala, Java, php, Python, Javascript, R, UML, SQL, NoSQL, HTML/CSS.

Software engineering technologies: JSON, RESTful, AngularJS, Play!, sbt, maven, docker.

Agile software development: Scrum framework.

System administration: Windows, Ubuntu/Debian, MySQL, Subversion, Git, YouTrack.

Desktop publishing: \LaTeX , BibTeX, Microsoft Office, OpenOffice.

Internet of Things: Raspberry Pi, Plugwise, TelosB, smart meters.

Languages

Mother tongue **Macedonian**

Other languages ¹	Understanding		Speaking				Writing	
	Listening		Reading		Interaction		Production	
English ²	C2	Fluent	C2	Fluent	C2	Fluent	C2	Fluent
Slovene	C1	Fluent	C1	Fluent	B2	Independent	B2	Independent
Serbo-Croatian	C2	Fluent	C2	Fluent	C1	Independent	B2	Independent
Dutch ³	A2	Basic	A2	Basic	A2	Basic	A2	Basic

¹Common European Framework of Reference (CEFR) level

²Course in Academic Writing in English at the University of Groningen

³Diploma Inburgeringsexamen

Personal interests

Music, films, languages, travelling, running.