

Lecturer

Name: Virginie Marelli

Academic Background: Master in Mathematics and economics

Field of Specialization: Lead data scientist

Employer: Dataroots

Previous Positions: management trainee at ING, data scientist at ING, data scientist at Cap Gemini

Contacts:

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CV: <https://www.linkedin.com/in/virginie-marelli-58721970/>

Lecturer

Name: Hendrik Blockeel

Academic Background: Professor in machine learning & computer science

Field of Specialization: theory and algorithms for machine learning and data mining in general, with a particular focus on relational learning, graph mining, probabilistic logics, inductive knowledge bases, and applications of these techniques in the broader field of computer science, bio-informatics, and medical informatics.

Employer: KU Leuven

Previous Positions:

- October 1994 - December 1994: research assistant , KU Leuven
- January 1995 - December 1998: research assistant at KU Leuven
- January 1999 - September 1999: Post-doctoral research assistant
- October 1999 - September 2008: Post-doctoral Fellow of the Research Foundation – Flanders
- October 1999 - September 2005: Assistant professor, KU Leuven
- October 2005 - September 2009: Associate professor , KU Leuven
- January 2007 - : Part-time associate professor , Universiteit Leiden
- October 2009 - : Professor, KU Leuven

Contacts:

Email: hendrik.blockeel@cs.kuleuven.be

Web site: <https://people.cs.kuleuven.be/~hendrik.blockeel/>

List of recent/ Relevant Publications:

- TILDE, an efficient and versatile relational decision tree learner (Blockeel and De Raedt, 1998) that has been used in many relational learning applications
- ACE, a tool for relational learning that includes TILDE and several other relational learning algorithms and is based on an advanced special-purpose logical inference engine (Blockeel et al., 1999)

- Predictive Clustering: a framework for symbolic machine learning that generalizes decision tree and rule learning and encompasses, besides the classical classification and regression tasks, also multi-label classification, conceptual clustering, semi-supervised learning, subgroup discovery, and ranking (Blockeel et al., forthcoming). The predictive clustering framework has been implemented in TILDE and in Jan Struyf's Clus system.
- Experiment Databases for Machine Learning (Blockeel and Vanschoren, 2007): such databases store complete descriptions of learners, datasets and experimental conditions of a large number of machine learning experiments, and offer advanced querying capabilities, to the extent that a single query may answer questions that would otherwise require extensive experimenting on the user's side. A proof of concept, ExpDB, is online, containing results of over 600,000 experimental runs.

CV: https://people.cs.kuleuven.be/~hendrik.blockeel/cv_ext.html

Lecturer

Name: Evgeniya Korneva

Academic Background: Engineer in machine learning & computer science

Field of Specialization: Machine learning & computer science

Employer: KU Leuven

Previous Positions:

- Laboratory Assistant (Laboratory for Research in Inflation and Growth) - jul. 2014 – aug. 2015
- Teaching Assistant - 2013 – jun. 2015
- Laboratory Assistant (Research Laboratory for Science and Technology Studies)

Contacts:

Email: evgeniya.korneva@kuleuven.be

List of recent/ Relevant Publications:

- Korneva E., Blockeel H. (2018). Model Selection for Multi-Directional Ensemble of Regression and Classification Trees. In: BNAIC 2018 Preproceedings Presented at the Benelearn, 's-Hertogenbosch, 08 Nov 2018-09 Nov 2018.
- Van Wolputte E., Korneva E., Blockeel H. (2018). MERCS: Multi-directional Ensembles of Regression and Classification Trees. In: <https://www.aaai.org/ocs/index.php/AAAI/AAAI18/paper/view/16875/16735> (Paper No. 16875) (4276-4283). Presented at the AAAI Conference on Artificial Intelligence, New Orleans, Louisiana, USA, 02 Feb 2018-07 Feb 2018. ISBN: 978-1-57735-800-8.

CV: <https://www.linkedin.com/in/evgeniako/?originalSubdomain=be>

Lecturer

Name: Marie-Francine Moens

Academic Background: Professor in Language intelligence & information

Field of Specialization: Her main direction of research is the development of novel methods for automated content recognition in text and multimedia using statistical machine learning and exploiting insights from linguistic and cognitive theories. She investigates topics such as:

- Machine learning for natural language understanding, especially learning with limited supervision.
- Machine learning for information retrieval, classification and aggregation.
- Deep learning and latent variable models.
- Information extraction, machine reading, semantic parsing, text mining, knowledge acquisition in the biomedical and legal domains.
- Web search and mining.
- Multimodal and multilingual processing, alignment and summarization of content.
- Information retrieval and search models, question answering and reasoning.
- Processing of noisy text such as user generated content and speech transcripts.
- e-Forensics: content and email filtering.

Employer: KU Leuven

Previous Positions:

- Full professor at the Department of Computer Science (KU Leuven) and head of its Informatics Section: 2015-.
- Professor at the Department of Computer Science (KU Leuven): 2011-2015.
- Associate professor at the Department of Computer Science (KU Leuven): 2007-2011.
- Associate professor at the Centre for Law and ICT (KU Leuven): 2005-2007.
- Part-time assistant professor at the Centre for Law and ICT (KU Leuven): 2002-2005.
- Postdoc researcher at the Centre for Law and ICT (KU Leuven): 1999-2005.
- Researcher at the Centre for Law and ICT (KU Leuven): 1992-1999.

Contacts:

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Web site: <https://people.cs.kuleuven.be/~sien.moens/>

List of recent/ Relevant Publications:

- Moens, M.-F. (2006). Information Extraction: Algorithms and Prospects in a Retrieval Context (The Information Retrieval Series 21). New York: Springer (246 p.).
- Moens, M.-F. (2000). Automatic Indexing and Abstracting of Document Texts (The Kluwer International Series on Information Retrieval 6). Kluwer Academic Publishers: Boston (265 p.). (publication of Ph.D. thesis)
- A survey on the application of recurrent neural networks to statistical language modeling
W De Mulder, S Bethard, MF Moens

CV: <https://people.cs.kuleuven.be/~sien.moens/CVMoens.pdf>

Lecturer

Name: Jim Dratwa

Academic Background: MSc in physics, philosophy and life sciences and received his Ph.D. in socio-economics of innovation from the Ecole des Mines de Paris and his Ph.D. in moral and political philosophy from the Université Libre de Bruxelles; pre- and post-doctoral Fellow at Harvard Law School and Harvard Kennedy School of Government, with the Science, Technology, and Public Policy program

Field of Specialization: Ethics and Governance of Emerging Technologies (AI)

Employer: European Commission / Woodrow Wilson Center / Free University of Brussels

Previous Positions: cf. above

Contacts:

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Most recent/ relevant publication:

My latest book: www.istegroup.com/dans-quel-monde-voulons-nous-vivre-ensemble/

CV: https://ec.europa.eu/research/ege/pdf/jim_dratwa-cv_bio500w.pdf

Lecturer

Name: Jeroen Vanderstukken

Academic Background: MSc in Mathematical Engineering

Field of Specialization: Mathematical Engineering

Employer: McKinsey & Company

Previous Positions: Internships in software development

Contacts:

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CV: <https://www.linkedin.com/in/jeroen-vanderstukken-984465105/>

Lecturer

Name: Prof. Frederik Maes,

Tom Eelbode,

Siri Willems,

Sofie Tilborghs,

Jeroen Bertels

Field of Specialization: Medical Image Analysis

Employer: KU Leuven, Dept. ESAT/PSI

Contacts:

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tom.eelbode@kuleuven.be,

siri.willems@kuleuven.be,

sofie.tilborghs@kuleuven.be,



Summer Course '19: The name is I, AI

jeroen.bertels@kuleuven.be
Web site: www.medicalimagingcenter.be

Lecturer

Name: Frederik De Keyzer,
Dr. Georg Schramm

Field of Specialization: Medical Imaging

Employer: KU Leuven, Dept. Imaging & Pathology,
& UZ Leuven, Radiology / Nuclear Medicine

Contacts:

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georg.schramm@uzleuven.be

List of recent/ Relevant Publications:

KU Leuven Lirias:

Frederik Maes: <http://lirias.kuleuven.be/cv?Username=U0007203>

Frederik De Keyzer: <http://lirias.kuleuven.be/cv?Username=U0040830>

Georg Schramm: <http://lirias.kuleuven.be/cv?Username=U0102742>

Google Scholar:

Frederik Maes: <https://scholar.google.be/citations?hl=nl&user=ntG32ZgAAAAJ>

Frederik De Keyzer: https://scholar.google.be/citations?hl=nl&user=yJAhY_4AAAAJ

Georg Schramm: <https://scholar.google.be/citations?hl=nl&user=txZ90cAAAAJ>

Lecturer

Name: Bart Demaegdt

Academic Background: Industrial Engineer in Automation

Field of Specialization: Digitalization Technology Manager

Employer: Siemens Belgium N.V.

Previous Positions: Active at Siemens since 1996

Contacts:

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CV: More info here: <https://www.linkedin.com/in/bartdemaegdt/>

Follow me on **Twitter:** <https://twitter.com/DemaegdtBart>

Lecturer

Name: Laurens Hebberecht

Academic Background: /

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Summer Course '19: The name is I, AI

Field of Specialization: Product owner for virtual assistance (Customer Care & Contact Services)

Employer: Belfius

Previous Positions: /

Contacts:

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Lecturer

Name: Wouter Boussemaere

Academic Background: BSc Applied Informatics, MSc Enterprise Architecture

Field of Specialization: Enterprise Architecture

Employer: Belfius Bank, ICInstitute

Previous Positions: Lector Data architecture @ ICInstitute

EA Consultant @ inno.com

EA Manager @ VRT

EA Manager @ Volvo Group

Contacts:

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Web site: (optional)

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Lecturer

Name: Jérôme Fortias

Academic Background: /

Field of Specialization: Artificial Intelligence

Employer: BrightKnight

Previous Positions: AI Practice Leader at Sopra Steria, Business Lab manager at Sopra...

Contacts:

Email: jerome.fortias@brightknight.eu

Web site: <http://www.jfortias.net>

Lecturer

Name: Sam De Bodt

Academic Background: Master of Computer Science Engineering

Field of Specialization: Artificial Intelligence & Robotics

Employer: Belfius

Previous Positions: Student

Contacts:

Email: sam.debodt@belfius.be

CV: www.linkedin.com/in/sam-de-bodt-ab1166187



Summer Course '19: The name is I, AI

Lecturer

Name: Niels Maes

Academic Background: Business Economics

Field of Specialization: Business Analyst

Employer: Belfius

Previous Positions: Product Owner @ XPO Logistics

Contacts:

Email: niels.maes@belfius.be

CV: [linkedin.com/in/niels-maes](https://www.linkedin.com/in/niels-maes)

Course description

Title: The name is I, A.I.

Fields of activity: Data science, machine learning & computer science, Language intelligence & information, Ethics and Governance of Emerging Technologies (AI), Mathematical Engineering, Medical Image Analysis, Medical Imaging, Automation, Enterprise Architecture, Business Economics

Examination type: written exam + small presentation

Number of ECTS credits issued: 1.0

Learning Goals and Objective:

- Learning the theoretical fundamentals of AI, and specifically machine learning: what is it, what is it not, what to pay attention to
- Getting inspired to apply machine learning in future technical endeavours by seeing how it is applied in a bunch of different ways, from finance to healthcare to industry
- Learning about the ethics and governance of AI
- Creating a fundamental understanding of machine learning/deep learning on which they can build by putting it into practice more easily later
- Learning the principles of deep learning with medical imaging data and the main considerations for practical implementation of a deep learning algorithm

Syllabus

Name of activity	Dataroots - use cases - data exploration
Number of working hours	2h
Type of activity	Data science methodology explained through a real data science case (with python code)
Lecturer	Virginie Marelli
Short summary of content	<p>What the students will learn through the course</p> <ul style="list-style-type: none"> • Steps to create a good model • Best practices to build an AI project • Tips and tricks on common problems that arise in data science • Best practices to deploy a model <p>The course is split in the different steps of a project:</p> <ul style="list-style-type: none"> • ETL • Data preprocessing • Modelling • Deployment <p>Session 1:</p> <p>Introduction</p> <ul style="list-style-type: none"> • Project planning • Presentation of the use case • Data pipeline • Data understanding
Bibliography	Basic python knowledge (pandas, numpy)
Expected effect	Understanding the first step of a data science project

Name of activity	Visualisations - Target - Features
Number of working hours	2h
Type of activity	Data science methodology explained through a real data science case (with python code)
Lecturer	Virginie Marelli

Short summary of content	<p>What the students will learn through the course</p> <ul style="list-style-type: none"> • Steps to create a good model • Best practices to build an AI project • Tips and tricks on common problems that arise in data science • Best practices to deploy a model <p>The course is split in the different steps of a project:</p> <ul style="list-style-type: none"> • ETL • Data preprocessing • Modelling • Deployme <p>nt Session 2:</p> <ul style="list-style-type: none"> • Data exploration and visualization • Target variable creation • Features creation
Bibliography	<p>Basic python knowledge (pandas, matplotlib)</p> <p>Visualizations familiarity</p>
Expected effect	<p>Understanding of the visualization and pre-processing of the data</p>

Name of activity	Introduction to Machine Learning
Number of working hours	2
Type of activity	Lecture
Lecturer	Hendrik Blockeel
Short summary of content	Key concepts and theory of machine learning
Bibliography	/
Expected effect	The students will have a fundamental understanding of machine learning on which they can build by putting it into practice more easily later

Name of activity	Introduction to Deep Learning
Number of working hours	2

Type of activity	Lecture
Lecturer	Hendrik Blockeel
Short summary of content	Key concepts of deep learning specifically: why it has such good performance
Bibliography	/
Expected effect	The students will understand what makes deep learning specifically so successful, and will be able to apply it adequately more easily

Name of activity	Deep learning for natural language processing
Number of working hours	2
Type of activity	Lecture
Lecturer	Marie-Francine Moens
Short summary of content	How deep learning can be applied to extract useful information from natural language texts.
Bibliography	/
Expected effect	The students will understand the peculiarities of the application of deep learning for language understanding. This will give them a theoretical basis to work further on if they would later need to use it for this domain

Name of activity	Machine learning: exercises
Number of working hours	2
Type of activity	Exercise session
Lecturer	Evgeniya Korneva
Short summary of content	The students will solve machine learning exercises in a jupyter notebook
Bibliography	/
Expected effect	The students will have some experience in actually coding machine learning functionality

Name of activity	Ethical view on AI
Number of working hours	2h
Type of activity	Masterclass
Lecturer	Jim Dratwa
Short summary of content	Participatory thought experiment and co-creation on the ethics and governance of artificial intelligence.
Bibliography	No previous reading necessary.
Expected effect	Perplexity; individual and collective insights; and indeed sound grasp of the key issues and stakes with regard to the ethics and governance of artificial intelligence.

Name of activity	Pizzas and random forests
Number of working hours	2h
Type of activity	Short intro to what management consultancies are doing in the data science and machine learning space, followed by an interactive data science case (“project”) in Industry in groups of ~4
Lecturer	Jeroen Vanderstukken
Short summary of content	<ul style="list-style-type: none"> • Share high-level the impact of AA on the Industry • Take you through a typical “project” <ul style="list-style-type: none"> ○ Understand core machine learning concepts we apply ○ Apply them on a practical case in Industry ○ Learn where the value-add is coming from – and how that is largely from AA fostering “cross-functional” discussions
Bibliography	N/A
Expected effect	<p>To provide participants with an understanding of</p> <ul style="list-style-type: none"> - where >90% of the legacy companies in the industry are on their analytics journey - how oftentimes rough machine learning models can contribute to value-add in the industry

Name of activity	Industrial usage of AI-ML
Number of working hours	2 hour session
Type of activity	Info session / Interactive Mode
Lecturer	Bart Demaegdt
Short summary of content	<p>AI has found its way to a large amount of B2C domains, but what about the industrial implementation of AI?</p> <p>In which of the B2B domains is this technology capable to deliver new insights?</p> <p>And will the AI-robots take over soon?</p> <p>Bart Demaegdt will give an update on the current state of affairs regarding the use of AI as enabler for new added value</p>
Bibliography	/
Expected effect	Highlight the transformative power of AI-ML from within an industrial context. In other words tease the students to go into that direction.

Name of activity	Deep learning in medical imaging: principles and applications
Number of working hours	2h
Type of activity	Presentations
Lecturer	Frederik Maes, Tom Eelbode, Siri Willems, Sofie Tilborghs, Jeroen Bertels
Short summary of content	Introduction to deep learning and its application in medical image analysis.
Bibliography	-
Expected effect	Learning the principles of deep learning with medical imaging data and the main considerations for practical implementation of a deep learning algorithm, illustrated with various state-of-the-art examples from current research at KU Leuven / UZ Leuven in radiotherapy, cardiology, neurology and gastro-enterology...

Name of activity	Deep learning hands-on
Number of working hours	3,5h
Type of activity	Practical session
Lecturer	Tom Eelbode
Short summary of content	Practical session on the use of deep learning for medical image analysis. Groups of students work together and different groups compete among each other to obtain optimal performance for a certain deep learning application by comparing different network architectures and tuning their training hyper-parameters.
Bibliography	-
Expected effect	Hands-on practical experience with deep learning on a real-world medical imaging dataset in the context of a clinically relevant application. Programming experience with Python using Keras and Tensorflow on a GPU server. Experimentation with and getting feeling for the effect of different training setups (data augmentation, normalization, dropout...).

Name of activity	Guided tour in UZ Leuven Radiology / Nuclear Medicine
Number of working hours	45 min
Type of activity	Guided tour
Lecturer	Frederik De Keyzer, Georg Schramm
Short summary of content	Guided tour behind the scenes of the UZ Leuven Radiology and Nuclear Medicine departments. Explanation of CT, MRI, PET and SPECT imaging principles and technologies.
Bibliography	-
Expected effect	Deep learning in medical imaging starts with the acquisition of the data. Medical imaging creates 3D tomographic images of the human body, showing both anatomical as well as functional information. Successful application of deep learning for medical imaging applications requires insight in the data and the clinical requirements, with is facilitated by interdisciplinary collaboration.

Name of activity	Chatbot / FAQbot
Number of working hours	30 min
Type of activity	Demo of our chatbot
Lecturer	Laurens
Short summary of content	The journey Belfius went through to have several chatbot and virtual assistant
Bibliography	
Expected effect	Learn what are the hurdle of making a chatbot in a company

Name of activity	Studio
Number of working hours	30 min
Type of activity	The type of the activity. More info about types
Lecturer	Jerome
Short summary of content	Approach of BrightKnight on AI : Multi agents, RNN, CNN, Reinforcement learning, NLP, Machine learning, ElasticSearch and Neo4J as DB for AI
Bibliography	none
Expected effect	Sharing our understanding of AI as a Lego, a real AI solution should be a association of different AI and deterministic parts including a self-improvement part.

Name of activity	AIR
Number of working hours	30 min
Type of activity	Workshop
Lecturer	Sam de Bodt / Niels Maes
Short summary of content	Students will learn about RPA and NLP technology and how this is applied within a financial institution.
Bibliography	N/A

Expected effect	Receive a deeper understanding of AI & Robotics technologies and reflect on how this can be used within a company.
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Name of activity	Data architecture
Number of working hours	30 min
Type of activity	Lecture on the high level data architecture @ Belfius + Q&A
Lecturer	Wouter Boussemaere
Short summary of content	What is (and will) Belfius doing to become data centric?
Bibliography	-
Expected effect	Understanding that the data architecture needs to be made fit for purpose if you want to reap the benefits of AI in an organisation.

Name of activity	Modelling - Good code
Number of working hours	2h
Type of activity	Data science methodology explained through a real data science case (with python code)
Lecturer	Virginie Marelli
Short summary of content	<p>What the students will learn through the course</p> <ul style="list-style-type: none"> ● Steps to create a good model ● Best practices to build an AI project ● Tips and tricks on common problems that arise in data science ● Best practices to deploy a model <p>The course is split in the different steps of a project:</p> <ul style="list-style-type: none"> ● ETL ● Data preprocessing ● Modelling ● Deployment <p>Session 3:</p> <ul style="list-style-type: none"> ● Model creation

	<ul style="list-style-type: none"> • Model benchmarking and performances • Model explainability • Writing good code
Bibliography	Python knowledge (sklearn) Modelisation knowledge
Expected effect	Understanding of modelling

Name of activity	DAGs, CI/CD, deployment
Number of working hours	2h
Type of activity	Data science methodology explained through a real data science case (with python code)
Lecturer	Virginie Marelli
Short summary of content	<p>What the students will learn through the course</p> <ul style="list-style-type: none"> • Steps to create a good model • Best practices to build an AI project • Tips and tricks on common problems that arise in data science • Best practices to deploy a model <p>The course is split in the different steps of a project:</p> <ul style="list-style-type: none"> • ETL • Data preprocessing • Modelling • Deployment <p>Session 4:</p> <ul style="list-style-type: none"> • DAGs • CI/CD
Bibliography	Basic python knowledge API
Expected effect	Understand the deployment phase of a model

Pre-materials

Links:

Name	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5479722/pdf/nihms833401.pdf
Topic/field	Deep Learning in Medical Image Analysis
Short description	Shen et al.: Annu Rev Biomed Eng. 2017 June 21; 19: 221–248

Name	https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8241753
Topic/field	Deep Learning applications in Medical Image Analysis
Short description	Ker et al.: IEEE Access, vol. 6, 2018

Name	https://reader.elsevier.com/reader/sd/pii/S1361841517301135?token=02F6D61A051EF99C3DB0802C567259563A61E278BDD872A620793DA18F152431F3AA2464D1CD7629A2D244B9E8CC6F82
Topic/field	A survey on deep learning in medical image analysis
Short description	Litjens et al: Medical Image Analysis 42 (2017) 60–88

Name	http://www.r2d3.us/visual-intro-to-machine-learning-part-1/
Topic/field	Machine learning
Short description	A very visual introduction to the basic concepts of machine learning

Name	Stories
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Topic/field	Inspiring stories about applied new technologies @SIEMENS
Short description	https://new.siemens.com/global/en/company/stories/home.html

Name	Magazine
Topic/field	Inspiring news about applied new technologies (BE)
Short description	https://magazine.siemens.be/

Books/Articles:

Name	https://www.deeplearningbook.org/
Topic/field	Deep Learning
Chapter/Section (for books)	We don't expect you to read it completely, but multiple chapters can be interesting, so you can read as much as you want.
Professor/Author	Goodfellow I.