

ARTIFICIAL INTELLIGENCE: DREAMS, RISKS AND REALITY

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ARTIFICIAL INTELLIGENCE: DREAMS, RISKS AND REALITY

March 7th and 8th, 2017

WELCOME

Dear Invited Speakers and Participants,

It cannot be denied that Artificial Intelligence is having a fast growing impact in many areas of human activity. It is helping humans to communicate with each other, even beyond linguistic boundaries, find information in the vast information resources available on the web, solve challenging problems that go beyond the competence of a single expert, and enable the deployment of autonomous systems, such as self-driving cars, that handle complex interactions with the real world with little or no human intervention. These applications are perhaps not like the fully autonomous conscious intelligent robots that science fiction stories have been predicting, but they are nevertheless very important and useful, and most importantly they are real and here today.

But neither can it be denied that Artificial Intelligence comes with certain risks. Many people (including luminaries such as Bill Gates or Stephen Hawking) believe that the main risk of artificial intelligence is that it gets out of hand. Machines that can learn, reconfigure themselves, and make copies of themselves may outrun the human race, become smarter than us and take over. To researchers in the field this risk seems far-fetched. But they see other risks, which are already upon us and need urgent remediation. Concretely, AI algorithms, particularly those embedded in the web and social media, are having an important impact on who talks with whom, how information is selected and presented, and how facts (justified or fake) propagate and compete in public space. Critics point out that these AI algorithms are now held (at least partly) responsible for allowing the emergence of a post-truth world, highjacking democratic decision processes, and dangerously polarizing society. Polarization is making it much more difficult to deal with the big issues facing our society, such as climate change mitigation, diminishing pollution, achieving economic prosperity for an exploding world population, coping with massive migration, etc. They all require determined collective action and therefore a political consensus.

This B-debate, organized by Biocat and “La Caixa” Foundation, together with the Institut de Biologia Evolutiva (IBE - CSIC/UPF), the Institut d'Investigacio en Intel·ligencia Artificial (CSIC), and the EU H2020 Project Odyceus, brings together top experts concerned with the benefits and risks of AI, particularly, but not exclusively, in the domain of web and social media, and seeks to come up with ways to deal with these risks.

Yours sincerely,

Luc Steels and Ramon Lopez de Mantaras (Scientific Leaders), Scientific Committee and B-Debate

PROGRAM

Tuesday, March 7th, 2017

14:00 Welcome

Luc Steels, IBE - UPF/CSIC

Ramon Lopez de Mantaras, Artificial Intelligence Research Institute (IIIA), Spanish National Research Council (CSIC)

14:30 SESSION 1: IS AI READY FOR LARGE-SCALE DEPLOYMENT?

Chair: **Ramon Lopez de Mantaras**, Artificial Intelligence Research Institute (IIIA), Spanish National Research Council (CSIC), Barcelona, Spain

The Human Use of Machine Learning

Marcello Pelillo, University of Venice, Venice, Italy

AI: The challenge of enlightened democratic control

Hector Geffner, Universitat Pompeu Fabra, Barcelona, Spain

15:30 Discussion

16:00 Coffee Break

16:30 SESSION 2: SOCIETAL IMPACT OF AI

Chair: **Carles Sierra**, IIIA (CSIC/UAB), Bellaterra, Spain

Potential implications of social media on political attitudes and behaviors

Camilo Cristancho, UAB, Barcelona, Spain

The regulation of emerging technologies

Antoni Roig, UAB, Barcelona, Spain

17:30 Discussion and conclusions

18:00 Discussion: Barcelona Declaration for the Proper Development and Usage of Artificial Intelligence in Europe

Chair: **Luc Steels**, IBE - UPF/CSIC, Barcelona, Spain

18:30 End of the session

Wednesday, March 8th, 2017

8:45 Registration

9:00 Welcome

Jordi Portabella, Director, Area of Research and Knowledge, la Caixa Foundation

Marta Soler, Head of Research and Scientific Debate, Biocat

Luc Steels, ICREA Research Professor, IBE - UPF/CSIC

Ramon Lopez de Mantaras, Director, Artificial Intelligence Research Institute (IIIA)

9:15 SESSION 1: DREAMS: HOW IS ARTIFICIAL INTELLIGENCE PRESENTED IN POPULAR CULTURE?

Chair: **Carles Sierra**, IIIA (CSIC/UAB), Bellaterra, Spain

Designing the Perfect Assistant: Robotic AI, Ethics and Science Fiction

Carme Torras, IRI (CSIC/UPC), Barcelona, Spain

9:45 Open discussion

10:00 SESSION 2: REALITY: WHAT ARE RECENT TECHNICAL BREAKTHROUGHS IN AI AND HOW DO THEY IMPACT APPLICATIONS?

Chair: **Ramon Lopez de Mantaras**, Spanish National Research Council (CSIC), Barcelona, Spain

Part A. Advances in knowledge-based AI

How the semantic web is transforming information access

Guus Schreiber, Vrije Universiteit Amsterdam, Amsterdam, Netherlands

Advances in Natural Language Processing and how they can bring truth, security, and order in cyberspace

Walter Daelemans, University of Antwerp, Antwerp, Belgium

11:00 Open discussion

11:30 Coffee break

12:00 Part B. Advances in machine learning

Facts and myths about deep learning

Joan Serrà, Telefonica I+D, Barcelona, Spain

Real-world Machine Learning: A View From the Trenches!

Francisco Martin, BigML, Corvallis, Oregon, USA

13:00 Open discussion

13:15 Lunch

14:15 SESSION 3: RISKS

Chair: **Luc Steels**, IBE - UPF/CSIC, Barcelona, Spain

Part A. The role of AI in social media

The algorithm decides? On the influence of algorithmic selection in digital media platforms

Cornellus Puschmann, Hans Bredow Institute for Media Research, Hamburg, Germany

Confirmation bias and post-truth society

Walter Quattrociocchi, IMT, School for Advanced Studies Lucca, Rome, Italy

15:30 Open discussion

16:00 Coffee break

16:30 Part B. Making AI safe and beneficial

Chair: **Luc Steels**, IBE - UPF/CSIC, Barcelona, Spain

Our future with AI: potential benefits and ethical considerations

Francesca Rossi, IBM T.J. Watson Research Centre, New York, USA

Title to be confirmed

Francesca Bria, Ajuntament de Barcelona, Barcelona, Spain

17:30 Open discussion

18:00 Concluding panel: Barcelona Declaration for the Proper Development and Usage of Artificial Intelligence in Europe

Chair: **Michele Catanzaro**, freelance journalist, Barcelona, Spain

Antoni Roig, UAB, Barcelona, Spain

Francesca Rossi, IBM T.J. Watson Research Centre, New York, USA

Luc Steels, IBE - UPF/CSIC, Barcelona, Spain

18:30 End of the meeting

SCIENTIFIC COMMITTEE



Luc Steels, ICREA Research Professor at **Institute for Evolutionary Biology (IBE - UPF/CSIC)**, Barcelona, Spain.

Luc Steels is currently research professor at the Catalan Institute for Advanced Studies (ICREA), working in the Institute for Evolutionary Biology (IBE - UPF/CSIC) in Barcelona. He studied linguistics at the University of Antwerp (Belgium) and computer science at MIT, specializing in Artificial Intelligence under Marvin Minsky. After his studies he first worked in the application of knowledge-based AI for industrial expert systems at the geophysical measurement company Schlumberger (in the US and France). In 1983 he returned to Europe and founded the Artificial Intelligence Laboratory of the Free University of Brussels (VUB) which quickly became one of the pioneering labs in Europe in the nineteen-eighties, pushing advances in knowledge technologies, neural networks and genetic algorithms. In the nineties his laboratory spearheaded work in behavior-based robotics. In 1996, Steels became founding director of the Sony Computer Science Laboratory in Paris, a laboratory which became known for highly innovative researchers in the domain of language, music and sustainability. In 2011 he created the Language Evolution Lab at IBE in Barcelona which focuses on modeling how new words, meaning and grammar can arise through situated embodied interactions between agents. Since the nineteen-eighties, Luc Steels has played a big role in the organization of AI. He was founding chairman of the Belgian AI association, which merged later with the Dutch AI association to form BNAIC. He was involved in setting up ECCAI, the largest organization of AI in Europe, and was founding editor (with Bob Wielinga) of AI Communications, the largest European AI journal. He chaired some of the key conferences in AI in Europe, such as ECAI, SAB, EKAW, a.o.. He participated as P.I. and coordinator in a dozen major European projects, and helped shape the European research agenda towards AI at the EU level.



Ramon Lopez de Mantaras, Director of **Artificial Intelligence Research Institute (IIIA)**, CSIC, Barcelona, Spain.

Research Professor of the Spanish National Research Council (CSIC) and Director of the Artificial Intelligence Research Institute (IIIA). Master of Sciences in Computer Science from the University of California Berkeley, PhD in Physics (Automatic Control) from the University of Toulouse, and PhD in Computer Science from the Technical University of Barcelona. A pioneer of Artificial Intelligence in Spain, with contributions, since 1976, in Pattern Classification, Approximate Reasoning, Expert Systems, Machine Learning, Case-Based Reasoning, Autonomous Robots, and AI & Music. Author of numerous papers and invited plenary speaker at numerous international conferences. Editorial board member of several international journals, including AI Magazine, and former Associate Editor of the Artificial Intelligence Journal. ECCAI Fellow and recipient, among other awards, of the “City of Barcelona” Research Prize in 1981, the “2011 American Association of Artificial Intelligence (AAAI) Robert S. Engelmore Memorial Award”, the “2012 Spanish National Computer Science Award” from the Spanish Computer Society, and the Distinguished Award of the European Association of Artificial Intelligence (EurAI) in 2016. President of the Board of Trustees of IJCAI from 2007 to 2009. He serves on a variety of panels and advisory committees for public and private institutions based in the USA and Europe. Presently working on case-based reasoning, machine learning for autonomous robots and AI applications to music. For additional information please visit: <http://www.iiia.csic.es/~mantaras>.



Ulises Cortés, Professor, **Universitat Politècnica de Catalunya / Barcelona Supercomputing Center**, Barcelona, Spain.

Ulises Cortés is a Full-Professor and Researcher of the Universitat Politècnica de Catalunya (UPC) since 1982 (tenured since 1988 and habilitated as Full-Professor since 2006) working on several areas of Artificial Intelligence (AI) in the Computer Science department including Knowledge Acquisition for and concept formation in knowledge-based systems, as well as on Machine Learning and in Autonomous Intelligent Agents. Since 1998 until 2012, he is the Coordinator of the Artificial Intelligence Ph.D. program for the Technical University of Catalonia. Since, 2012, Prof. Cortés is Deputy vicerector for European Research or the Technical University of Catalonia. Since 2007 and until 2012, Professor Cortés was the Academic Coordinator of the Barcelona Supercomputing Center. (BSC) He is the Academic Coordinator for the Interuniversity Master programme on Artificial Intelligence from 2011 (he was from 2005 to 2010). Since 2012 he coordinates the relations with Latin America at BSC. Since 1989 Professor Cortés and his group have been applying their work in Artificial Intelligence to Environmental Sciences in special to Wastewater Treatment Plants with the financial support of CICYT and CIRIT and the European Union. He is a co-founder of SISLTECH and member of its Board of Directors since 2011.



Carles Sierra, Research Professor at **Spanish National Research Council (CSIC)**, Barcelona, Spain.

Carles Sierra is Vice-Director of the Artificial Intelligence Research Institute (IIIA) of the Spanish National Research Council (CSIC) located in the area of Barcelona. He has been contributing to Artificial Intelligence research since 1985 in the areas of Knowledge Representation, Auctions, Electronic Institutions, Autonomous Agents and Multiagent Systems, and Agreement Technologies. He has participated in more than 20 EU funded projects, is or has been member of several journal editorial boards including AIJ and JAIR and is the editor-in-chief of the JAAMAS journal. He organised IJCAI in 2011 in Barcelona and is the Program Chair of IJCAI 2017. He is an EurAI Fellow.



Ricard Solé, ICREA research professor and Head of **Complex Systems Laboratory** at the **Pompeu Fabra University**, Barcelona, Spain.

Ricard Solé, a physicist and biologist, is ICREA research professor at the Pompeu Fabra University where he heads the Complex Systems Laboratory. He is also a visiting fellow at the Santa Fe Institute (New Mexico) and at the Center for Evolution and Cancer at the University of California (San Francisco). He is on the editorial advisory boards of several international journals. He has degrees in Physics and Biology from the University of Barcelona and obtained a PhD in Physics from the Technical University of Catalonia (UPC). He has been awarded grants from the James McDonnell Foundation, the Botín Foundation and an ERC Advanced Grant. He also received the 2004 City of Barcelona Prize for his research work. One of his main research interests is to understand the origins of complexity and its destruction in biological and artificial systems, with the aim of discovering how complex systems develop qualities such as multicellularity, the capacity for computation, robustness and the ability to evolve. In order to achieve this, his laboratory engages in both theoretical and experimental research, which includes an ambitious programme of synthetic biology.



Oscar Vilarroya, Senior Researcher at **Universitat Autònoma de Barcelona (UAB)**, Barcelona, Spain.

Oscar Vilarroya Oliver, MD and PhD, is Associate Professor of Psychiatry at the Universitat Autònoma de Barcelona (UAB), where he is the director of the Cognitive Neuroscience Unit (URNC) as well as director of the “Social Brain” Chair. He is also the coordinator of the Neuroimaging Research Group (NRG) at the Institut Hospital del Mar d'Investigacions Mèdiques (IMIM). Both the URNC and NRG have the aim of applying neuroimaging techniques to the study of psychiatric diseases, as well as the study of cognitive functions in general. Oscar Vilarroya has also directed the UAB "social brain" Chair, a platform for discussion, research and dissemination whose objective is the application of the latest neuroscientific knowledge in the understanding of human social behavior. Oscar Vilarroya has published scientific articles, and essays such as "Paraula de Robot" (Universitat de València, 2006), and "The Dissolution of Mind" (Rodopi, 2002). He has also had an active role in popularizing science in the media, especially in newspapers and radio.

DETAILED PROGRAM AND INVITED SPEAKERS

Tuesday, March 7th, 2017

Session 1: Is AI ready for large-scale deployment?



Ramon Lopez de Mantaras, Director of Artificial Intelligence Research Institute (IIIA), CSIC, Barcelona, Spain.

(See his CV at the Scientific Committee section)

Chair of the SESSION 1



Marcello Pelillo, Professor of Computer Science at Ca' Foscari University in Venices and director of the European Centre for Living Technology (ECLT), Venice, Italy.

Marcello Pelillo is Professor of Computer Science at Ca' Foscari University in Venice, Italy, where he directs the European Centre for Living Technology (ECLT) and the Computer Vision and Pattern Recognition group. He held visiting research positions at Yale University, McGill University, the University of Vienna, York University (UK), the University College London, the National ICT Australia (NICTA), and is an external affiliate of the Department of Computer Science at Drexel University (USA). He has published more than 200 technical papers in refereed journals, handbooks, and conference proceedings in the areas of pattern recognition, computer vision and machine learning. He is General Chair for ICCV 2017, Track Chair for ICPR 2018, and has served as Program Chair for several conferences and workshops, many of which he initiated. He serves (has served) on the Editorial Boards of the journals IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), Pattern Recognition, IET Computer Vision, Frontiers in Computer Image Analysis, Brain Informatics, and serves on the Advisory Board of the International Journal of Machine Learning and Cybernetics.

The Human Use of Machine Learning

Ethical worries have accompanied machine learning research from the very outset. As early as 1950's, for example, the founding father of cybernetics, Norbert Wiener, famously prophesied: "Woe to us if we let [a machine] decide our conduct, unless we have previously examined its laws of action, and know fully that its conduct will be carried out on principles acceptable to us!" Although until recently these discussions have been typically dismissed as purely academic exercises, the overwhelming intrusion of machine learning algorithms in almost all aspects of our daily lives has made them suddenly topical. The very nature of the problem at stake calls for a close interaction among philosophers, lawyers, computer scientists and engineers. It is therefore of the utmost importance to establish a common background for discussion and to set the stage for an interdisciplinary alliance among interested parties. To this end, in this talk, I'll try to provide a summary of the debate that is currently taking place within the machine learning community concerning the ethical challenges faced by researchers and practitioners. I'll focus, in particular, on issues that emerged in an IEEE-sponsored workshop I've recently organized at the European Centre for Living Technology, in Venice, Italy, devoted precisely to this theme.



Hector Geffner, ICREA Research Professor at Universitat Pompeu Fabra (UPF), Barcelona, Spain.

ICREA Research Professor at the Universitat Pompeu Fabra where he heads the AI group. Member of the board of the European AI Association. His research in mathematical computational models of reasoning, planning, and interaction.

AI: The challenge of enlightened democratic control

A key issue surrounding technological progress in general is how to make it play in favour of the common good. In the quest for more autonomous robot and agents, this question takes a second form in AI, namely, how to align the values of these agents with the values of humans. These concerns are all reflected in the recent The Asilomar AI principles declaration signed by hundreds of AI scientists worldwide. However, if we want these declarations to be more than an enumeration of good intentions to feel good, it is necessary to analyze what are the forces that are shaping developments in AI, and whether their values are aligned with the common good or not. In this sense, citizens should not fully trust corporations or experts that have their short term interests, nor their most primary feelings or "alternative facts". The pursuit and the defense of the common good, in particular in times of rapid technological change, requires citizens with critical minds, able and willing to engage in informed, reasoned, and democratic dialogue. The unfinished project of the Enlightenment is more necessary now than ever. Too bad that we are too busy with our mobile phones.

Session 2: Societal Impact of AI



Carles Sierra, Research Professor at **Spanish National Research Council (CSIC)**, Barcelona, Spain.

(See his CV at the Scientific Committee section)

Chair of the **SESSION 2**



Camilo Cristancho, Juan de la Cierva fellow at the **Universitat Autònoma de Barcelona**, Barcelona, Spain.

Camilo Cristancho is a Juan de la Cierva post-doctoral research fellow at the Universitat de Barcelona. He is member of the research groups for the Quality of democracy and Democracy, Elections and Citizenship where he studies political attitudes and behavior. He works with data science, statistical and experimental methods and his main publications deal with contentious politics, online social networks and protest, and political use of the internet on electoral campaigns. His current research deals with attitudes towards protest, the potential of social media on political equality, attitudes and effects of exposure to disagreement and electoral outcomes of protest.

Potential implications of social media on political attitudes and behaviors

Political contents are expected to follow market logics in leveraging AI for contents personalization and targeting in social media. I will discuss the potential implications of contents selection and network effects on political attitudes and behavior from a communication and political psychology perspective. Attitude reinforcement, affective polarization and other-disregarding behavior have been identified as socially inconvenient outcomes which are related to communication dynamics and social interaction patterns. To what extent is AI related to these phenomena is a relevant question when reflecting on the proper usage of AI.



Antoni Roig, Constitutional Law Professor at **Universitat Autònoma de Barcelona, IDT-UAB**, Bellaterra, Spain.

2012-2016 UAB Executive Coordinator of the Erasmus Mundus Doctorate "Law, Science and Technology" (with the Universities of Bologna, Torino, Luxembourg, Vilnius and Tilburg)
2012-2013 Director of the Institute of Law and Technology (IDT-UAB).
1998-2011 Open University of Catalonia. Professor at the Law School "Constitutional Law".

1996-1997 Visiting Scholar Catholic University of Milan and Florence

1999 Coordinator of a Computer Crimes Course at the Catalan Police Law School

1997-2011 Researcher GRC (Research of Excellence)-DURSI- 2420-04. Generalitat de Catalunya, IDT-GRES (Sociolegal Research Group)

2002 Consultant Contract for a project ("Active policies to work and social" of the Foundation "Roberto Ruffilli", Forlì)

(Italy) 10 hours

2001-2003 Coordinator of the Law School double degree in Business and Law (Universitat Autònoma de Barcelona)

1990-1992 Professor in Catalan Regional Public Law (Catalan Police School)

1998-2016 Tenured Professor in Constitutional Law, Autonomous University of Barcelona (UAB) (Spain), UAB Professor of Constitutional Law

2008-2016 Researcher of the IDT-UAB Institute of Law and Technology

The regulation of emerging technologies

Regulation of technology is a complex task in a constantly evolving field. Law has adapted with general frameworks based on principles. Doing so, the legal priorities can be implemented even in changing conditions. However, the limits of general regulation have soon been obvious: implementation of abstract principles requires case-by-case determination. Judicial decisions do not cover all the risk scenarios so a complement to legal principles was needed. Risk-based impact assessments are now helping data protection compliance of RFID tags or smart metering. More, according to the accountability principle, stakeholders have to prove they effectively comply with law. The legal principle is therefore linked to technical standards and measures. But, this valuable enrichment may be insufficient. Engineers and risk experts are not lawyers: implementing legal principles does not simply mean adding a technical layer to them or, worse, replacing them. Law and technology experts should partially merge into sectorial communities in order to offer shared regulatory frameworks. Some possible partners will be mentioned, and the first results of this shared regulation will be suggested.

Wednesday, March 8th, 2017

Session 1: DREAMS: How is artificial intelligence presented in popular culture?



Carles Sierra, Research Professor at Spanish National Research Council (CSIC), Barcelona, Spain.

(See his CV at the Scientific Committee section)

Chair of the SESSION 1



Carme Torras, Research Professor at Institut de Robòtica i Informàtica Industrial (CSIC-UPC), Barcelona, Spain.

Carme Torras (<http://www.iri.upc.edu/people/torras>) is Research Professor at the Spanish Scientific Research Council (CSIC), and Head of the Perception and Manipulation group at the Robotics Institute in Barcelona. She holds M.Sc. degrees in Mathematics and Computer Science from the University of Barcelona and the University of Massachusetts, Amherst, respectively, and a Ph.D. degree in Computer Science from the Technical University of Catalonia (UPC). In the scientific domain, Prof. Torras has published five books and near three hundred papers in the areas of artificial intelligence, computer vision, neurocomputing and robotics. She has led 12 European projects and supervised 18 PhD theses on these topics, and she is currently Editor of the IEEE Transactions on Robotics. She was Associate Vice-President for Publications of the IEEE Robotics and Automation Society (RAS), and has been elected to serve in the governing board of IEEE RAS in the period 2016-2018. Prof. Torras was awarded the Narcís Monturiol Medal of the Generalitat de Catalunya in 2000, and became ECCAI Fellow in 2007, member of Academia Europaea in 2010, and Member of the Royal Academy of Sciences and Arts of Barcelona in 2013. In the literary domain, her robotics novel, *La mutació sentimental* (The Sentimental Mutation), won the Manuel de Pedrolo Prize and the Ictineu Prize to the best Catalan science-fiction book published in 2008, and it was later translated into Spanish. She has contributed to several collective volumes, and her story *La vida e-terna* won the 2014 Ictineu Prize to the best SF short story. Prof. Torras has participated in many activities to promote Ethics in Robotics: she has delivered talks at local, national and international venues (e.g., at ICRA-13's forum "Robotics meets the Humanities"), and she has written essays on science fiction and ethics. She is currently developing some pedagogical materials to teach Roboethics based on her novel *The Sentimental Mutation*.

Designing the Perfect Assistant: Robotic AI, Ethics and Science Fiction

Until recently, commercial robots had little to do with the androids inhabiting science fiction movies and novels. This is rapidly changing as robots are no longer confined to factories, but they are progressively spreading to urban, social and assistive domains. In the coming years we will see robots attending elderly and disabled people, performing household tasks, acting as support teachers, assistants in shopping malls, receptionists, guides at trade-fairs and museums, and even as nannies and playmates. These new robots must be able to interact with people and assist users in a friendly, effective and secure way. However, how these qualities translate into the traits of a "perfect" assistant vary largely not only among cultures, but also among individuals. As a curiosity, some robot designers have searched inspiration in the virtues attributed to the Victorian lady's companion. What is clear is that robot assistants pose new, very attractive research challenges to Robotic AI. They should be easy to instruct by non-expert users, intrinsically safe to people, able to manipulate not only rigid but also deformable objects, capable of communicating and working collaboratively, and highly adaptable to non-predefined and dynamic environments. A quick overview of research on these topics will be provided. Robot assistants pose also fundamental ethic questions, many practical ones stemming from autonomous robot decision making conflicting with human freedom and dignity. A longer-term issue is how our increasing interaction with robots will affect individual identity, society and the future of humankind. What human capabilities will be enhanced, which will be extinguished and which new ones will appear. Given the difficulty of predicting how a technological society will evolve, a reasonable option is to imagine different possible future scenarios and encourage debate on the pros and cons to try to guide techno-scientific research in the most desirable direction. Philosophy, psychology and law are shedding principled light on these issues, while arts and science-fiction freely speculate about the role the human being and the machine may play in this "pas à deux" in which we are irremissibly engaged.

Session 2: REALITY: What are recent technical breakthroughs in AI and how do they impact applications?



Ramon Lopez de Mantaras, Director of Artificial Intelligence Research Institute (IIIA), CSIC, Barcelona, Spain.

(See his CV at the Scientific Committee section)

Chair of the SESSION 2



Guus Schreiber, Professor of Computer Science & Dean of the Faculty of Science, Vrije Universiteit Amsterdam, Amsterdam, Netherlands.

Guus Schreiber is a professor of Intelligent Information Systems at the Department of Computer Science department of the VU University Amsterdam. His research interests are mainly in knowledge and web science, with a special interest for applications in the field of cultural heritage. He was one of the key developers of the CommonKADS methodology. He acted as chair of W3C groups for Semantic Web standards such as RDF 1.1, OWL, SKOS and RDFa. His Web & Media research group is involved a wide range of national and international research projects. Schreiber studied medicine at the University of Utrecht. After working two years at the University of Leiden in the Medical Informatics department he joined in 1986 the SWI (Social Science Informatics) group of Bob Wielinga at the University of Amsterdam, where he was involved in research on knowledge engineering. In 1992 he was awarded a Ph.D. on a thesis entitled "Pragmatics of the Knowledge Level". In 2003 he moved to the VU.

How the semantic web is transforming information access

Not available.



Walter Daelemans, Professor, CLiPS Computational Linguistics Group, University of Antwerp, Antwerp, Belgium.

Walter Daelemans is professor of Computational Linguistics at the University of Antwerp where he directs the CLiPS computational linguistics research group. His research interests are in machine learning of natural language, for example in the development of Memory-Based Language Processing (CUP, 2005); computational psycholinguistics, especially exemplar based alternatives to mental rules as representations explaining language acquisition and processing; computational stylometry, with a focus on authorship attribution and author profiling from text; and language technology applications, for example biomedical information extraction and cybersecurity systems for social networks. He is an elected fellow of EurAI and ACL and member of the Royal Academy for Dutch Language and Literature.

Advances in Natural Language Processing and how they can bring truth, security, and order in cyberspace

I will briefly describe two dominant current approaches in Natural Language processing: cognitive computing (e.g. Watson) and Deep Neural Nets (e.g. as used by Google Translate). I will focus on how these technologies can help the analysis of text (including communication in social media) at different levels: (1) analyzing the facts expressed, (2) opinions and emotions of the writer about these facts, and (3) the demographic (age, gender, region) and psychological (personality, education level, mental health) profile of the writer of the text. The relatively detailed linguistic analysis of social media communication allows useful applications such as factuality analysis and deception detection, detecting instances of racist, suicidal or harassing behavior, and checking the truthfulness of public profiles by comparing them to analyzed profiles. This could benefit the users of social media by bringing more safety and reliability but also raises important privacy concerns. As a case study, I will present the results of the AMiCA project, a project that aimed at safeguarding children and adolescents in social media from three types of threats: cyberbullying, sexually transgressive behavior, and suicide announcements.



Joan Serrà, Research Scientist, Telefónica Research, Barcelona, Spain.

Joan Serrà is a research scientist with Telefónica R&D in Barcelona, Spain. He works on machine learning and artificial intelligence, and typically deals with sequential and/or sparse data. He obtained his MSc (2007) and PhD (2011) in Computer Science from Universitat Pompeu Fabra, Barcelona. During that time, he was also an adjunct professor with the Dept. of Information and Communication Technologies of the same university (2006-2011). He did his postdoc in Artificial Intelligence at IIIA-CSIC, the Artificial Intelligence Research Institute of the Spanish National Research Council in Bellaterra, Barcelona (2011-2015). He has had research stays at the Max Planck Institute for the Physics of Complex Systems in Dresden, Germany (2010), the Max Planck Institute for Computer Science in Saarbrücken, Germany (2011-2012), and visited Goldsmiths, University of London, United Kingdom (2012-2013). He has been involved in more than 10 research projects, funded by Spanish and European institutions, and co-authored over 80 publications, many of them highly-cited and in top-tier journals and conferences, in diverse scientific areas. He also regularly acts as peer reviewer for some of those and other publications.

Facts and myths about deep learning

Deep learning has revolutionized the traditional machine learning pipeline, with impressive results in domains such as computer vision, speech analysis, or natural language processing. The concept has gone beyond research/application environments, and permeated the media, internet blogs, job offers, startup investors, and big company executives' meetings. But what is behind deep learning? Why has it become so mainstream? What can we expect from it? In this talk, I will highlight a number of facts and myths that will provide a shallow answer to the previous questions. While doing that, I will also highlight various applications we have worked on at our lab. Overall, the talk wants to place a series of basic concepts, while giving ground for reflection or discussion on the topic.



Francisco Martin, CEO, **BigML, Inc**, Corvallis, Oregon, United States of America.

Francisco is the CEO at BigML, Inc where he helps conceptualize, design, architect, and implement BigML's distributed Machine Learning platform. Formerly, Francisco founded and led Strands, Inc, a company that pioneered Behavior-based Recommender Systems. Previously, he founded and led Intelligent Software Components, SA (iSOCO), the first spin-off of the Artificial Intelligence Research Institute (IIIA) of the Spanish National Research Council (CSIC). He holds a 5-year degree in Computer Science, a Ph.D. in Artificial Intelligence, and a post-doc in Machine Learning. He is the holder of more than 20 patents in the areas of Recommender Systems and Machine Learning.

Real-world Machine Learning: A View From the Trenches!

The Artificial Intelligence (AI) hype machine has been running at full throttle for the last few years. Machine learning, one of the most rigorously researched AI subfields, has had a few high-profile successes in that period, and that is all it has taken to drive the imaginations of many observers into science fiction. In fact, many of those success stories were built on decades-old techniques that have only now become feasible thanks to the availability of large-scale computation at low costs. The sources of this frenzied perception of machine learning are varied and many; from journalists seeking sensationalist angles, to professors that now make football player salaries, to venture capitalists pouring unprecedented amounts of money into untested, unproven, and often bizarre AI approaches. However, headlines do not make science fiction into fact, neither human nor robotic neurons are amplified by dollars, and general intelligence will not be created in the lifespan of a venture fund. The human involvement needed to develop any basic application that shows a minimum level of intelligence is still huge. When we see a new "AI" beating the best humans at Go or Poker, we rarely get a detailed account of the arduous tasks and enormous amount of grunt work behind the scenes that make these applications really work. Usually, these efforts involve dozens or hundreds of hours collecting and preparing data, meticulous tweaking and fine-tuning of algorithms (that took academia years to invent and perfect), and finally preparing and deploying the infrastructure necessary to transform the data seamlessly into a computer program that can take comprehensible actions. The resulting system often still requires specialized hardware, is useless without significant human interaction, and rarely generalizes beyond the very specific problem it was designed to solve. While the increased attention and investment will help accelerate some research, it will certainly help rediscover that we are further than we believe from producing truly intelligent, general purpose applications at massive scale or with some more general intelligence on them anytime soon. In this talk, I will try to provide a grounded view of what it takes to build an end-to-end machine learning-based application, as well as some evidence on how far AI is from threatening our world.

Session 3: RISKS



Luc Steels, ICREA Research Professor at **Institute for Evolutionary Biology (IBE - UPF/CSIC)**, Barcelona, Spain.

(See his CV at the Scientific Committee section)

Chair of the **SESSION 3**



Cornelius Puschmann, Senior Researcher at **Hans Bredow Institute for Media Research**, Hamburg, Germany.

Cornelius Puschmann is a senior researcher at the Hans Bredow Institute for Media Research in Hamburg where he coordinates the international research network Algorithmed Public Spheres, as well as an associate at the Alexander von Humboldt Institute for Internet and Society (HIIG) in Berlin. His interests include interpersonal communication online (particularly hate speech), the role of algorithms for selection media content, and methodological aspects of computational social science.

The algorithm decides? On the influence of algorithmic selection in digital media platforms

Algorithms have emerged both as a prominent object of academic study and a fixture in the public imagination in recent years. As the use of digital media permeates all areas of life, at least for those citizens who own a smartphone and have regular access to the internet, the processes by which digital media is filtered, selected, and assembled through algorithmic personalization come under increased scrutiny, from (for example) scholars and journalists, but also (increasingly) from regulators. In my talk I will emphasize the importance of algorithms for filtering, ranking and selecting media content and for structuring digital communication. In contrast to the use of data mining in areas such as healthcare, credit scoring and general business analytics, where such tech techniques have a long tradition, the impact of algorithms on the public sphere poses novel challenges. How are communication, media, and public discourse impacted by transferring the dominant logics of consumption from other industries to news, information, and political deliberation, implemented in social media platforms, search engines, and on news websites? How can we better understand the inner workings of algorithms and their significance for us individually and as a society?.



Walter Quattrociocchi, Head of the Laboratory of Computational Social Science, IMT Lucca, Rome, Italy.

Walter Quattrociocchi is currently heading the Laboratory of Computational Social Science at IMT Lucca. His research interests include dynamic networks, cognitive science, graph algorithms, dynamic processes on complex networks. Recently, his research has focused on the information and misinformation diffusion, and the emergence of collective narratives in online social media as well as their relation with the evolution of opinions. He collected more than 50 papers on peer reviewed conferences and journals. His results on misinformation spreading served to inform the Global Risk Report of the World Economic Forum and have been intensively covered by the media (Washington Posts, New Scientist, Bloomberg, Salon, Poynter, NYT). For a summary of his findings on misinformation see: How does misinformation spread online? World Economic Forum Agenda <https://www.weforum.org/agenda/2016/01/q-a-walter-quattrociocchi-digital-wildfires/>

Confirmation bias and post-truth society

Not available.



Francesca Rossi, IBM researcher and professor of computer science, IBM Research and University of Padova, New York, USA.

Francesca Rossi is a distinguished research scientist at the IBM T.J. Watson Research Centre, and an professor of computer science at the University of Padova, Italy, currently on leave. Her research interests focus on artificial intelligence, specifically they include constraint reasoning, preferences, multi-agent systems, computational social choice, and collective decision making. She is also interested in ethical issues in the development and behaviour of AI systems, in particular for decision support systems for group decision making. She has published over 170 scientific articles in journals and conference proceedings, and as book chapters. She has co-authored a book. She has edited 17 volumes, between conference proceedings, collections of contributions, special issues of journals, as well as the Handbook of Constraint Programming. She has more than 100 co-authors. She is a AAI and a EurAI fellow, and a Radcliffe fellow 2015. She has been president of IJCAI and an executive councillor of AAI. She is Associate Editor in Chief of JAIR and a member of the editorial board of Constraints, Artificial Intelligence, AMAI, and KAIS. She co-chairs the AAI committee on AI and ethics and she is a member of the scientific advisory board of the Future of Life Institute. She is in the executive committee of the IEEE global initiative on ethical considerations on the development of autonomous and intelligent systems and she belongs to the World Economic Forum Council on AI and robotics. She has given several media interviews about the future of AI and AI ethics (including to the Wall Street Journal, the Washington Post, Motherboard, Science, The Economist, CNBC, Eurovision, Corriere della Sera, and Repubblica) and she has delivered three TEDx talks on these topics.

Our future with AI: potential benefits and ethical considerations

The future will see autonomous machines acting in the same environment as humans, in areas as diverse as driving, assistive technology, and health care. Think of self-driving cars, companion robots, and medical diagnosis support systems. We also believe that humans and machines will often work together and agree on common decisions. Thus hybrid collective decision making systems will be in great need. In this scenario, both machines and collective decision making systems should follow some form of moral values and ethical principles (appropriate to where they will act but always aligned to humans'). In fact, humans would accept and trust more machines that behave as ethically as other humans in the same environment. Also, these principles would make it easier for machines to determine their actions and explain their behaviour in terms understandable by humans. Moreover, often machines and humans will need to make decisions

together, either through consensus or by reaching a compromise. This would be facilitated by shared moral values and ethical principles. In this talk I will describe the great potential of AI to save lives and solve societal and planetary problems, while pointing out the ethical considerations involved in its development and deployment. I will also mention some initiatives, such as the Partnership on AI, whose goal is to educate, discuss, and possibly solve the issues related to the pervasive use of AI.



Francesca Bria, Chief Technology and Digital Innovation Officer, **Barcelona City Council**, Barcelona, Spain.

Francesca is a senior expert and advisor on digital strategy, technology and information policy. She is a Researcher and Teaching Associate at Imperial College Business School in the Innovation Studies Centre- Digital Economy Lab. She has a background in social science and innovation economics, a PhD from Imperial College, and an MSc in E-business and Innovation from the University College of London, Birkbeck. Francesca is a member of the Internet of Things Council and an advisor for the European Commission on Future Internet and Smart Cities policy. She is also a member of the EC Expert Group on Open Innovation (OISPG) and a member of the European Research Cluster on the Internet of Things (IERC). Francesca has been advising a variety of organisations and public institutions on innovation policy, open technology, the Internet of Things and smart cities. She is also active in various innovation movements advocating for open access, open technologies and digital rights

Concluding panel: Barcelona Declaration for the Proper Development and Usage of Artificial Intelligence in Europe



Michele Catanzaro, Freelance journalist, Barcelona, Spain.

Michele Catanzaro (Rome, Italy, 1979) is a journalist based in Barcelona, Spain. He has a PhD in Physics from the Technical University of Catalonia (UPC, Barcelona) on complex networks theory. He has worked since 2001 as a freelance, writing about science, environment, health, technology, and science policy. He has worked as well on justice and organized crime. His working languages are English, Spanish, Italian, and Catalan. He collaborates with Nature, Science, Physicsworld, Chemistry World, The Guardian, El Periódico (Spanish newspaper) and Le Scienze (Italian version of Scientific American), among other media.

Chair of the **SESSION**



Antoni Roig, Constitutional Law Professor at **Universitat Autònoma de Barcelona**, IDT-UAB, Bellaterra, Spain.

(See his CV at the Session 2, 7th March)



Francesca Rossi, IBM researcher and professor of computer science, **IBM Research and University of Padova**, New York, USA.

(See his CV at the Session 3)



Luc Steels, ICREA Research Professor at **Institute for Evolutionary Biology (IBE - UPF/CSIC)**, Barcelona, Spain.

(See his CV at the Scientific Committee section)

PRACTICAL INFORMATION

Venue: CosmoCaixa Barcelona



CosmoCaixa Barcelona
C/ Isaac Newton, 26
08022 Barcelona, Spain

Conferences Meeting March 7th
Marie Curie room on 0 floor

Conferences Meeting March 8th
Agora room on -2 floor

Contact persons during the event



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SUGGESTED READING

The Next Step: Exponential Life (www.bbvaopenmind.com/libros), 2017 (available on-line for free)

El Imperio de Silicon Valley y su nuevo orden mundial, Vanguardia Dossier Número 63 (Enero/Marzo 2017)

Service Robots for Citizens of the Future. Torras, C. (2016) European Review, Vol. 24, No. 1, 17–30 2016 Academia Europæa. doi:10.1017/S1062798715000393

Social robots, a meeting point between science and fiction. Torras, C. (2014) MÈTODE Science Studies Journal. University of Valencia. DOI: 10.7203/metode.82.3546

OUTCOMES

B·Debateca

On the website of B·Debate, you will find all the information related with the celebration of the meeting that includes reports, conclusions, scientific documents, interviews with the experts, speaker's CVs, videos, images, press documentation and other related materials. We invite you to visit the section B·Debateca on www.bdebate.org

Contents of the meeting **“Artificial Intelligence: Dreams, Risks, and Reality”**

B·DEBATE International Center for Scientific Debate BARCELONA

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B-DEBATE · OPEN REGISTRATION
07/03/2017 a 08/03/2017
Artificial Intelligence: Dreams, Risks, and Reality

B-DEBATE · OPEN REGISTRATION
20/04/2017 a 21/04/2017
Genotype Tissue Expression (GTEx) Project Community Meeting. Enhancing the Usage of Human Genomics for the benefit of all

B-DEBATE · COMING
23/05/2017 a 24/05/2017
Zika virus and other mosquito-borne viruses. Science for preparedness and response in the Mediterranean region

PROGRAMA 2017
Programa d'activitats de B·Debate del 2017

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El càncer més enllà del genoma
Avui dia queden poques dubtes sobre el paper fonamental dels gens en l'inici

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B-Debate sees debate as a powerful, effective way to generate new knowledge. The debates are top-notch international scientific meetings featuring a selection of experts of renowned international prestige and scientists that work in Barcelona and Catalonia, moderated by scientific leaders. Since 2009 B-Debate has invited about 1200 recognized speakers and over 7.000 attendees. B-Debate seeks out answers to the challenges and needs of society in the field of life sciences, taking into account the complex, ever-changing conditions of this global world. The debates foster the integration of different disciplines of science and deal with such diverse topics as ageing, new therapeutic approaches to various diseases, innovative technology to improve knowledge of the human genome, food resources, new tools to integrate knowledge management, clinical genomics, neurosciences, climate change, and new energy sources, among others. The knowledge and results obtained through these events is spread throughout both the scientific community and general society through the various **B-Debate** channels and instruments.

More info: www.bdebate.org



The Institute of Evolutionary Biology (IBE) is a joint Institute of the Spanish National Research Council (CSIC) and the Pompeu Fabra University (UPF) and it constitutes one of the national references in the study of biodiversity, in the broadest sense, and its evolution, from a molecular and genomic perspective.

The basis of the IBE, and its main peculiarity, is to address biodiversity studies describing functional and evolutionary genomics at all levels of observation: molecular, biochemical, physiological, and morphological.

IBE activity involves more than a hundred people and 18 research groups distributed in five scientific programs related to Evolutionary Biology research.

More info: <https://www.ibe.upf-csic.es/>



UPF is a public, international and research-intensive university that, in just twenty-five years, has earned a place among the best universities in Europe. Awarded with a CEI label (International Excellence Campus) by the Spanish Ministry of Education, the University also figures in some of the most influential rankings. These results are possible due to the high competitiveness of UPF lecturers and researchers, and the strategic alliances with other entities (A4U, UCLA, John Hopkins University, Europaem, YERUN and CASA). In that sense, the University model is primarily based on a policy of being an institution that is open to the world, incorporating prominent national and international researchers. The outstanding research commitment is reflected in the excellent indicators, such as the volume of funds coming from Europe or indicators of scientific production. Additionally, the strategy begins to result in the form of patents and spin-offs of international impact.

More info: <https://www.upf.edu/>



The Spanish National Research Council (CSIC) is the largest public institution dedicated to research in Spain and the third largest in Europe, devoted to foster, coordinate, develop and promote scientific and technological research, of a multidisciplinary nature, in order to contribute to advancing knowledge and economic, social and cultural development, as well as to train staff and advise public and private entities on this matter. CSIC plays an important role in scientific and technological policy, since it encompasses an area that takes in everything from basic research to the transfer of knowledge to the productive sector. Its research community is composed by more than 15,000 staff, of whom more than 3,000 are staff researchers and the same number again are doctors and scientists who are still training. CSIC has 6% of all the staff dedicated to Research and Development in Spain, and they generate approximately 20% of all scientific production in the country.

More info: <http://www.csic.es/>



ICREA, Catalan Institution for Research and Advanced Studies, is a foundation supported by the Catalan Government and guided by a Board of Trustees. ICREA was created in response to the need to seek new hiring formulas that would make it possible to compete with other research systems on a similar footing by focusing on hiring only the most talented and extraordinary scientists and academics. It works hand in hand with Catalan universities and research centers to integrate ICREA research professors in the Catalan research system.

ICREA employs 255 researchers in all fields of knowledge, from philosophers to astrophysicists that perform their research in 50 different host institutions in Catalonia.

More info: <https://www.icrea.cat>

COLLABORATORS



CosmoCaixa offers interactive, enjoyable science and an open door for anyone who is eager to learn and understand and who never stops wondering why things are the way they are. **CosmoCaixa Barcelona** boasts the Geological Wall and the Amazon Flooded Forest, which features more than 100 plant and animal species that convince visitors they have been transported from the Mediterranean to the very heart of the tropical jungle. In addition to its permanent facilities and its open areas, CosmoCaixa offers a scientific and educational programme that includes exhibitions, workshops, conferences, courses and debates involving experts from all over the world.

More info: www.obrasocial.lacaixa.es
