Researcher CV

Name:

Christoph SCHOMMER

ORCID:

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Personal Statement (maximum 150 words):

My understanding of a functioning science lies in the symbiosis of research, teaching and outreach. The communication/appropriation of knowledge, its application and further development is a task that must not only benefit the university, but also the society. I see myself as someone who promotes, advises and supports young academics, produces and reviews scientific papers, facilitates a transfer of knowledge, but also as someone who demands independent thinking and a questioning of scientific findings. My research work is interdisciplinary and application-oriented, especially because Artificial Intelligence has experienced a renaissance in recent years and has become very important in many areas of scientific and social life. Besides the questions of technology, autonomy and consequences, there are also questions of ethics, explainability and transparency. And this is especially important in areas of research where sensitive decisions are to be made, as in the present area of financial crime prevention.

Personal details – Individual narrative profile (maximum 250 words):

I studied Artificial Intelligence at the German Research Centre for AI in Saarbrücken before working 8 years at IBM R&D as IT Architect in worldwide services projects concerning Business Intelligence. In parallel, I performed and received my PhD at Goethe University Frankfurt/Main (summa cum laude) before joining the University of Luxembourg as an Associate Professor in 2003.

Today, I lead a research group with 3 postdocs, 5 PhD candidates and 3 Master students, all performing interdisciplinary research using AI, Data Science, and Machine Learning. I am a scientific reviewer for the Dutch Research Council, Elsevier, Leibniz, Springer, IEEE and for more than 100 conferences (IJCAI, AAMAS, ACM, CogSci, ECML, and others).

I regularly organise lecture series and am author of about 100 scientific papers. I have (co)supervised 27 PhD students in Luxembourg, Leuven, Bologna, Torino, and London and have given about 150 courses at universities in Luxembourg (Computer Science, Mathematics), Berlin, Beijing, Singapore, and others.

I am constantly present in newspapers, radio, TV and at schools and research in numerous projects with industry (RTL, P&T, Thomson Reuters, and others) and in the scope of Esch22. I am the ViceHead of the UL Robolab, member of the Management Board of the DTU Digital Humanities & History, and a partner of the financialcomputing.net, which is a financial computing innovation platform between Luxembourg, London, Lisbon, and Rio. I have designed and implemented the Master in Computer Science and am currently leading the Bachelor in Computer Science.

Key outputs, contributions, and achievements (maximum 200 words per item):

Contributing to the generation of knowledge

My projects go back at the German AI Research Centre, where I developed new ideas in knowledge-based visualization and a new concept for disambiguation of ambiguous sentences. During my PhD, which I did in Computer Science at the University Hospital in Frankfurt/Main, I consulted companies in the field of Machine Learning and Data Mining (Natural substance screening, and others). As IT Architect at IBM, I found new insights in customer data projects by applying Data Mining in fields like market basket analysis, churn prevention, or fraud detection. At that time, I was member of the IBM Recognition Program and IBM Patent Program and spent several months at the Research Lab in Almaden, USA. I continued in applied research by consulting several companies with Machine Learning, Deep Learning, and NLP expertise. 3 papers submitted won the best paper award, more than 50% of my PhD students' PhD thesis received an 'outstanding'. I very much collaborate with colleagues and research groups across the university, for example with Linguistics, Philosophy, Finance, and Medicine.

Contributing to the development of individuals

I have been supporting students and young scientists for 25 years. This began at the universities in Frankfurt/Main and Potsdam, as well as during my time at IBM R&D. Since then, I have supervised or co-supervised 27 PhD projects (+ 12 ongoing), 74 Master's theses (+ 3 ongoing) and numerous Bachelor's theses. I also actively support students during their studies with advice and psychological support, write letters of reference on request and help students find jobs in industry. I am proud to say that former students work for Luxembourg companies such as Zortify, Talkwalker or have found their home in international companies such as KPMG, Price Waterhouse, IBM. I have also helped companies in finding suitable employees. At UL, I regularly mentor and support colleagues in questions around AI/Machine Learning. Namely, I have also invited scientists or even PhD students from other UL faculties to spend time as guests in my group. For some time now, I have also extended my field of activity to students from other universities, for example Singapore University or as part of a Master thesis at the FU Berlin.

Contributing to the wider research community and broader society

I am a member of the ACM, the Cognitive Science Society and the German Cognitive Science Society and a former member of the German Informatics Society. I am a scientific reviewer for Elsevier, Leibniz, Springer, IEEE and programme committee member for more than 100 conferences, some of them the most important ones, like IJCAI, AAMAS, ACM, CogSci, ECML, and others. So far, I have organised 8 'AI Lecture Series' and several PhD workshops in the field of Artificial Intelligence and beyond. I am the author of about 100 scientific papers. I am an active member of financialcomputing.net, an innovation platform for financial informatics, and of Last-JD, a joint international PhD programme in law, science and technology. I also maintain good contacts with the Luxembourg and German Ethics Councils. I publish 1-2 articles per year in the Luxemburger Wort and am regularly interviewed by Radio 100,7, RTL.lu, Paperjam, Revue, and other media. I have also been a guest on a talk show on the TV programme 'Kloertext'. I have supported Luxembourg schools in Kirchberg, Dudelange and Limpertsberg for various reasons ('Chercheurs à l'école') and have participated the 'Girls Days' at the FU Berlin.

Researcher CV

Name: Leendert VAN DER TORRE

ORCID: https://orcid.org/0000-0003-4330-3717

Personal Statement (maximum 150 words):

My overarching goal is to develop and investigate comprehensive formal models and computational realizations of individual and collective reasoning and rationality. I focus on innovative formal techniques with either near-term practical applications or inspiring visionary potential. For example, I use logic as an essential tool to enable machines to make rational decisions in an open and dynamic environment, to provide effective explanations to human beings, and to behave ethically and legally. Over the past few years, I have become interested in logic for new generation AI, combining knowledge-based and machine learning-based approaches. Moreover, I have developed a strong interest in cultural differences in legal and ethical explanations because, on the one hand, these notions have a strong societal impact, while, on the other hand, rigorous models are required to provide sufficient confidence in actual AI systems. To achieve these goals, I collaborate with researchers from many other disciplines and cultures.

Personal details – Individual narrative profile (maximum 250 words):

After positions in the Netherlands, Germany and France, in 2006 I joined the University of Luxembourg as a full professor for Artificial Intelligence. I became responsible for the strategic priority P1 of the University, which in 2009 led to the creation of the Interdisciplinary Center for Security, Reliability and Trust. To bring together various groups working on AI at the university, in 2009 I founded the AI RoboLab, which I headed since then. I was the head of the Department of Computer Science between 2015 and 2018, and was elected EurAI fellow (2016), member of CLAIRE Informal Advisory Group on Ethical, Legal and Social Issues (2019), board member of ESA-CLAIRE Special Interest Group on Space and AI (2020) and president of the International Forum of Computational Logic (IFCoLog, 2020).

Moreover, I was a visiting professor at Stanford University, USA in 2013 and became more interested in the entrepreneurial eco-system. I headed a project that provided a proof of concept for programming cognitive robots (ProCRbb), leading to one of the most successful spin-off companies of the university, specialized in robots for autistic children (LuxAI, 2015).

Moreover, since 2019 I am a part-time visiting professor at the Faculty of Philosophy and Cognition of Zhejiang University, China, allowing me to significantly expand my intercultural and interdisciplinary research program. In 2022 I bring together researchers, artists and the general public in the AI & Art pavilion of the university when Esch-Sur- Alzette is European Capital of Culture.

Key outputs, contributions, and achievements (maximum 200 words per item):

Contributing to the generation of knowledge

I develop logic for new generation AI driven by the insight that intelligent systems (like humans) are characterized not only by their individual reasoning capacity, but also by their social interaction potential. From this perspective I developed input/output logic (with David Makinson and colleagues in Luxembourg) and studied, for instance, deontic logics, formal argumentation, agent logic andlogic for AI. I have been active as an editor in this community: handbooks of deontic logic andnormative systems (f2013, 2021), first volume on handbook on formal argumentation (2018), Journal of Logic and Computation (deputy editor-in- chief), Logic Journal of the IGPL, the IFCoLog Journal of Logics and their Applications, and Argumentation and Computation (member of editorial boards). Currently I am developing (with colleagues) a framework and methodology---termed LogiKEy---for the design and engineering of ethical reasoners, normative theories and deontic logics. The overall motivation is the development of suitable means for the control and governance of intelligent autonomoussystems. An expanding dataset of case studies, in which the LogiKEy framework and methodology has been applied and tested, illustrate its potential for efficient experimentation.

Contributing to the wider research community

I did my PhD in an interdisciplinary institute on electronic commerce, and now I am a member of the interdisciplinary lab on intelligent and adaptive systems (ILIAS) and the interdisciplinary center on security, reliabilityand trust. I promote and contribute to a variety of interdisciplinary artificial intelligence topics,ranging from more abstract notions such as knowledge representation, reasoning, andexplainable AI, to more applied topics, such as social robotics, AI ethics and computational creativity. I created the interdisciplinary AI RoboLab in 2009 working on social robotics, AI ethics and computational creativity. I developed collaborations and joint projects with Department of Engineering, Law, Psychology, History and Philosophy. I was the coordinator of the Horizon2020 Marie Curie RISE Network "Mining and Reasoning with Legal Norms" (MIREL, 2016-2019) and I am an editor of handbook on legal AI (In preparation). As the chairof the DEON steering committee, 2014-18) I broadened the conference from two to six disciplines. As the head of department, I contributed to the design of the interdisciplinary space master, where I promote the view that we need to address challenges in many emerging areas, such as new space, from a technological, legal and entrepreneurial perspective.

Contributing to broader society

I developed the BOID agent architecture (with colleaguesfrom Vrije Universiteit Amsterdam), and on May 2nd, 2007, I delivered my inaugural speech "Violation games: a new approach of handling norms in intelligent systems." I developed the visualization and analysis components of the ArchiMate approach to enterprise architecture (with colleagues from CWI Amsterdam) which has become an industry standard. Moreover, Ideveloped the game- theoretic approach to normative multiagent systems (with Guido Boella from University of T orino), I contributed various results to the theory of argumentation, negotiation and collaboration among agents, and I am an editorof the handbook on normative multiagent systems (2018), Recently I am working on the use of agent theory and agreement technologies for personalized explainable AI, providing a set of techniques and methodologies aiming at explaining machine learning (ML) models, and enabling humans to understand, trust, and manipulate the outcomes produced by artificial intelligence effectively. I am in particular interested in explanations provided by and generated for children of different age classes, because the different mechanisms of reasoning more clearly be identified and distinguished in the explanations of children.

Researcher CV

Name: Luis A. LEIVA

ORCID: https://orcid.org/0000-0002-5011-1847

Personal Statement (maximum 150 words):

My research interests lie at the intersection of Human-Computer Interaction and Machine Learning, with an emphasis on solving problems that will help people throughout their daily lives. I have a formal academic background in Computer Science, Design, and Engineering, which I use to guide my research and create solutions that are expressive, natural, and sound. My main research area is Computational Interaction, where I combine computational thinking – abstraction, automation, and analysis – with data-driven models and methods to enable, explain, and support user interaction. I also conduct fundamental and applied research activities in Natural Language Processing and Information Retrieval.

Personal details – Individual narrative profile (maximum 250 words):

Before joining the University of Luxembourg as an Assistant Professor and Senior research scientist, I did two postdoctoral stays, one at Aalto University (Finland) and other at the Technical University of Valencia (Spain), where I also got my PhD in Computer Science.

I have 10+ years of academic experience and 5+ years of industry experience. I am also the co-founder and former CTO of Sciling, a machine learning company based in Spain. I am ranked among the top-10 Computational Interaction researchers in Google Scholar. My research has been featured in the international press, including e.g. New Scientist, Communications of the ACM, Phys.org, and Science Daily.

As a teacher and educator, my latest course was ranked among the top-10 best courses at Aalto University. I have been invited as guest lecturer abroad several times, including Aalto University and Primorska University (Slovenia).

I also have been visiting researcher at the Institute for Visualization andInteractive Systems in Stuttgart University (Germany) and the German Research Center for Artificial Intelligence (DFKI) in Saarbrücken. I am the recipient of several awards and recognitions both from industry and academia, including several outstanding reviewer recognitions and recognized contributions to outreach activities; for example, I have been recently invited as a keynote speaker in the popular "Elements of AI" course.

Key outputs, contributions, and achievements (maximum 200 words per item):

Contributing to the generation of knowledge

My research focuses on making the most of computing systems using the least amount of information from the user. My PhD thesis, which got the extraordinary doctorate award, showed that information inherently encoded in user interactions can be leveraged in a wide spectrum of applications and tasks. For example,I have exploited mouse cursor movements to conduct large-scale usability evaluations, predictuser engagement and attention, aid website revisitation, or restyle web design. All these workshave resulted in high-quality publications in reputable scientific conferences and journals. I have developed interactive human-in-the- loop machine learning techniques to support historians in the analysis of vast historical manuscript collections, including for example keyword spotting and transcription of legacy documents, where optical character recognition simply does not work. I am the co-creator of Warped K-Means, a clustering algorithm that can handle data sequences, which are commonplace among historical data. Before it, clustering algorithms had largely ignored how data objects were produced over time. I have also contributed to the development of novel visualization techniques to optimize the organization and retrieval of large and complex datasets, balancing the so-called exploration–exploitation problem, making it possible to find suitable materials in a matter of seconds.

Contributing to the development of individuals

I have supervised several BSc and MScstudents in academia, as well as my own teammates in industry. Many of them have been very successful in their careers, and some of them have come back to me requesting further advice and/or mentoring. I also have been in advisory boards to help shortlisting students at Aalto University and to recruit new employees at Sciling, the company I co-founded in 2014. I have been responsible teacher of MSc courses that I created at the Technical University of Valencia and at Aalto University. I have been very fortunate to educate a new generation of Computer Science students and to collaborate with the best ones upon successfully defendingtheir MSc or BSc theses. Now with the University of Luxembourg, as part of their educationalstrategy, I am preparing two BsC courses and an MSc course in the upcoming master's program in data science. I am also supervising a postdoctoral researcher and a PhD student.I look forward to mentoring more people and helping them succeed.

Contributing to the wider research community and broader society

I believe research should be disseminated to society so that everyone can learn and benefit from the latest advancements. I try to accomplish this goal by participating in projects with a clear focus on technology transfer. To date, I have co-authored 2 granted patents and have participated in 15research transfer projects. Most of these projects are being exploited today by private companies and public institutions. I often review for and serve in the program committee of several ACM/IEEE conferences and scientific journals. I am associate editor for the International Journal of Human-Computer Studies, one of the flagship journals in HCI. Scilingstarted as a joint effort to bring to industry and society the latest research in machine translation and interactive techniques that I co-invented at the Technical University of Valencia. We received funding from the European Commission through the SME Instrument program (Open Disruptive Innovation Scheme), a very competitive funding scheme for entrepreneurs and small companies. At Sciling we have worked for several international companies and even the public sector, including for example Lingvanex (Russia), NetRange (Germany), and the University of Montreal (Canada), among many others.

Fonds National de la
Recherche Luxembourg

Researcher CV

Name:

Martin THEOBALD

ORCID:

https://orcid.org/0000-0003-4067-7609

Personal Statement (maximum 150 words):

Since my doctoral studies, my research interests focused on the integration of Databases (DB) and Information Retrieval (IR). My dissertation (accompanied by the prototype implementation of the TopX search engine) focused on efficient query processing for XML documents and XPath-like queries, which can be considered as an almost classic DB topic. I also became interested in various Web applications, such as focused crawling and information extraction. The TopX prototype is a result of both these DB- and IR-related efforts, as it was specifically designed to handle complex IR-style queries with high-dimensional query expansions. With my following involvement as a Post-Doc in the Stanford Trio project, my focus was more on core DB issues, however with a variety of opportunities to work on interesting Web applications such as near-duplicate document detection and human-computer interaction (HCI) aspects. I have been diversifying my interests further toward Machine Learning, Cloud Computing and "NoSQL" Databases.

Personal details – Individual narrative profile (maximum 250 words):

I have been appointed as a Professor of Computer Science with a focus on "Big Data" by the University of Luxembourg, at the Faculty of Science, Technology and Medicine (FSTM), in 2017. I previously held positions as a Professor and Co-Director of the Institute for Databases and Information Systems (DBIS) at the University of Ulm, and as a Professor in the Advanced Database Research and Modeling (ADReM) group at the University of Antwerp.

I obtained a doctoral degree from the Max Planck Institute for Informatics in Saarbrücken in 2006 and subsequently spent two years as a Postdoctoral Researcher at the Stanford University "Infolab". Between 2008-2012, I led the research group for "Ranking and Uncertain Data Management" at the Max Planck Institute for Informatics.

I currently am head of the "Big Data"research group at the University of Luxembourg. I have served as PC member, reviewer andorganizer for more than 100 international conferences, workshops and journals, including SIGMOD, SIGKDD, SIGIR, VLDB, ICDE, CIKM, WSDM, TKDE, TODS, and many others. I have been an Area Editor for Elsevier's "Information Systems" between 2013-2018, and for PVLDB between 2020-2021. Current h-index: 32 (with more than 100 publications in Google Scholar) as of Feb. 2021.

Key outputs, contributions, and achievements (maximum 200 words per item):

Contributing to the generation of knowledge

I received three awards in the context of my doctoral dissertation between 2006 and 2007, namely an "ACM- SIGMOD Jim Gray Doctoral Dissertation Award (Honorable Mention)", a "GI-DBIS Dissertation Award" and an "Otto Hahn Medal of the Max Planck Society". Among these, especially the ACM-SIGMOD award is a world-wide recognition of my scientific achievements in the area of "Databases" during my doctoral studies. Only three doctoral theses (one primaryand two honorable mentions) are selected for this every year.

Contributing to the development of individuals

Teaching Award by the University of Luxembourg, 2020 – "The Teaching Award honours outstanding teachers committed to quality teaching and contributing significantly to the academic success of their students. Students and faculty staff members nominate their candidate for the teaching award selection committee who picks the final recipient of the award." Within our Faculty (FSTM), only two such Teaching Awards were awarded in 2020, hence I consider this award as a great recognition of my recent teaching activities at the University of Luxembourg.

Contributing to the wider research community

Google Focused Research Award (together with R. Gemulla and G. Weikum), 2011 – "Knowledge bases with entity- relationship-oriented facts are valuable assets for making sense of Internet content and for supporting applications like semantic search or text disambiguation. Projects on automatically building such knowledge bases from high quality Web sources have successfully applied two different paradigms: targeted information extraction with domain- model seeds for high-precision output, and explorative information extraction in an unsupervised manner with high recall but lower precision. Neither of the two has paid attention to the upcoming need of maintaining a knowledge base with evolving content and the entire life-cycle of knowledge management." Google's Focused Research Awards demonstrate a great recognition of scientific achievements across various disciplines and research institutions world-wide. The award was generously granted by Google with the amount of 500K USD over three years (between 2011 and 2014).

Researcher CV

Name: Pascal BOUVRY

ORCID: https://orcid.org/0000-0001-9338-2834

Personal Statement (maximum 150 words):

Full Professor in Computer Science at the University of Luxembourg and CEO of Luxembourg National HPC centre, I aim at contributing to new knowledge in the field and transferring it to society by education and innovation. With 30 years of experience in the fields of Artificial Intelligence and Combinatorial Optimization, my team develops advanced techniques and algorithmics for solving hard and large-scale problems. The latest developments rely on hybridization of nature-inspired techniques with learning methods and proved to be successful in UAV coordination, Private Equity Management, Bioinformatics, and Digital Hermeneutics. The success of these solutions is proven by a large number of awards (US Navy, European Investment Bank, etc), publications in high-impact venues, and real-world deployment. My team also provides services to the community in matters of High-Performance Computing. I am now looking forward at to solve hard problems using and developing new optimisation and learning techniques.

Personal details – Individual narrative profile (maximum 250 words):

During my Master degree in Computer Science at the University of Namur, Belgium, I developed a Debugger for the Meganode, a 128 transputer network at the LMC-IMAG laboratory in Grenoble, France. After obtaining a French grant (MRT) for my PhD, I designed, implemented and validated a set of new algorithms ranging from exact ones, to heuristics and meta-heuristics for solving scheduling problems. Part of these algorithms were incorporated into industrial solutions (Archipel-Telmat).

Then, I went on having gained a grant from the Dutch Government(NWO) and worked in CWI (Amsterdam, NL) on the Manifold coordination language. I designed and developed in that context a new visual programming language (Visifold) and also conceived distributed optimisation frameworks and algorithms for network computing. I gained industrial experience as manager of the technology consultant team in Brussels for FICS (belonging to S1corp), a world leader in electronic financial services.

Next, I went on as CEO and CTO of SDC, a Saigon-based joint venture between SPT (the second telecom operator in Vietnam), Spacebel SA (a Belgian leader in Space, GIS and Healthcare), and IOIT, a public research and training centre. After that, I had the opportunity to move to Montreal as VP Production of Lat45 and Development Director for MetaSolv Software, a world-leader in Operation Support Systems for the telecom industry (e.g. AT&T, Worldcom, Bell Canada, etc).I am nowadays serving as CEO of Luxprovide SA, the Luxembourg National HPC center, part of EURO-HPC, and Professor of Computer Science (parallel computing/optimisation).

Key outputs, contributions, and achievements (maximum 200 words per item):

Contributing to the generation of knowledge

I aimed at merging optimisation techniques, including nature-inspired methods, with machine learning for discrete optimisation problems, such as drone swarming or private equity management. The resulting algorithms lie between applied mathematics and computer science, such as operations research, algebra, graph theory, network science, game theory, evolutionary computing, machine learning. As a first key result, the creation of Loosely Coupled Genetic Algorithms (LCGA) in collaboration with Prof. Franciszek Seredynski from the Polish Academy of Science. These new algorithms are efficiently hybridizing game theoretical approaches with genetic algorithms. One of the techniques consists in slightly changing the problem (coordination between players, or adding additional incentives) to convert Nash Points into Global Equilibria. Another example of new algorithms is the extension of the work done by Marco Dorigo on Ant Colonies by defining repulsive pheromones and coupling them with the chaos theory for bringing deterministic behaviour to an initially stochastic algorithm. Revisiting Genetic Programming through higher abstraction levels such as gene expression programming, using heuristics as basic building blocks and coupling them with machine learning techniques (learning to optimise), lead to my latest generations of algorithms. I am also part of the editorial board of Elsevier SWEVO (Swarmand Evolutionary Computation) journal.

Contributing to the wider research community

Considering the computing-intensive aspects of these solutions, I also created and managed the High-Performance Computing service (over 600 users) of the University. This work aside from leading a set of system administrators also allowed me to research on related problems, such as energy-efficient data centres. Which was yet another way to show the bridge between academy and the real world, using real-world problem to steer the research direction. New techniques were created for bringing digital trust to cloud-based solutions, and new generation of middleware/resource management techniques for minimizing the electrical costs. The University of Luxembourg was then able to appear in the Green500 benchmark, providing open-source cloud simulator (Greencloud), take part in the ESFRI PRACE network and work with other EU experts on the H2020 PRACE6IP project. I am also part of the editorial board of IEEE Transactions on Sustainable Computing. The work operated in that context also was truly instrumental in winning the hosting of one of the EURO-HPC petascale solutions in the country. Which has been recognized by having the ministries of State and Economy asking me to bootstrap the new national centre as CEO.

Contributing to broader society

I am particularly proud of having a mixed industrial and academic background, having worked on 3 continents, trying to bridge both worlds by providing real high-level academic output, while also bringing a strong impact on society. I indeed believe that there is a true continuum between theoretical and applied research. The new master in Technopreneuship I created for the University in collaboration with our National Standards' Body(ILNAS) is a concrete instance of this bridge. This master is natural follow-up of 2 certificates of 18 ECTS that were operated by academics, industry and standardization professionals. Part of the content is resulting of a 4- year joint research programme with the ILNAS that involved 3 PhD students and one postdoctoral fellow. The master programme receives the labels of European standardization bodies CEN-CENLEC and ETSI. The first instance of the corresponding research programme addressed key ICT topics such as Big Data (community detection/clustering), cloud computing (cloud pricing), and Internet-of-Things (Distributed solutions for air traffic control for drones). The new programme addresses ICT (ArtificialIntelligence), Construction (Building Information Models), and Aerospace (UAVs).