



Issue 35 - June 2023

Marie Curie Alumni Association

Newsletter

Beyond the hype: How will large language models impact research practices?

Guest edited by
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Table of contents

Message from the Board	4
Editorial	5
News from the MCAA	
The MCAA chairs the EU Science Diplomacy Alliance	7
The value of continuous learning: Insights from the MCAA Learning Programme	9
Special Issue	
Interview to Iacer Calixto: The role of natural language processing and large language models in healthcare	12
Generative tools using large language models and translation	16
ChatGPT: A co-researcher?	19
ChatGPT: Unlocking the true potential of collective intelligence	21
Dialogues and transfers: The (po)ethical-practical rescue of the Digital Humanities	24
When machines and humans speak the same language: ChatGPT breaking language barriers	27

Proceed with caution: The potential negative impact of AI on scientific research	30
LLMs in healthcare: Where do we stand?	33
Beyond the hype: AI in healthcare - Ethical balance and insights	36
Quick adoption of ChatGPT by PhD students: For better?	39
How language AI can transform project management and boost efficiency and creativity	42
Partner Article	
Cyber Valley researchers link AI and society	46
Accessibility Statement	48

Message from the Board

Dear MCAA members,

Among the many opportunities and services provided by the MCAA to its members, those aiming to support Career Development are among the most prized. That's why, after much waiting, we are excited to finally announce the launching of our mentoring platform - designed specifically for the Marie Curie Alumni Association members. We developed this platform with the purpose of letting it grow into a tailored tool for career development, offering our members the opportunity to connect with experienced mentors from our rich community who can provide guidance and support as you navigate your career paths. As such, it is a unique offering for our members, allowing you to connect with other alumni who have expertise in the diverse flora and fields of interest in our community. The platform will also enable members to expand professional networks and build valuable connections across all sectors and career stages. If you haven't yet, do join [here](#). We call for all alumni to register as mentors and/or mentees, to give support and get support to each other!

In addition to the mentoring platform, we recently evaluated the effectiveness of our initiative to use the online learning platform Coursera as a tool for career development. We are pleased to report that the initiative has proven to be highly successful, with many members reporting that they found the courses engaging, relevant, and valuable for their career development.

Through the Coursera platform, members have access to a wide range of courses and specializations taught by top professors from leading universities around the world. This combination of online learning and mentoring has proven to be a powerful way to support career development and achieve professional goals.



As always, we are committed to supporting our members in their career development journeys. We encourage you to take advantage of the new mentoring platform, enroll in Coursera, attend the many workshops, webinars, and training provided, and continue to explore the many career development resources that are available to you as a member of the Marie Curie Alumni Association. An excellent example of training offered by MCAA is the one on communication led by our Communication WG. While the first courses have focused on science communication, more are in the making and will focus on a wide variety of topics, from research ethics to data management. And furthermore, why not take a step further in your involvement and join the Career Development WG and volunteer to contribute to the planning and organization of new opportunities tailored to your needs?!

Please do not hesitate to reach out to us if you have any questions or feedback. We look forward to continuing to support you in your career development journey.

Kind regards,

Marina Rantanen Modéer

On behalf of the MCAA Board

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Editorial

Dear MCAA members,

"In recent years, large language models (LLMs) have emerged as a significant breakthrough in the field of artificial intelligence. These models, such as GPT-3, can process vast amounts of text data and generate human-like responses to a wide range of natural language queries.

The development of LLMs has enormous potential for a range of applications, from research and healthcare to education, entertainment, but also customer services. Their ability to understand and respond to natural language queries in a way that is both accurate and engaging opens up new possibilities for improving the way we interact with technology.

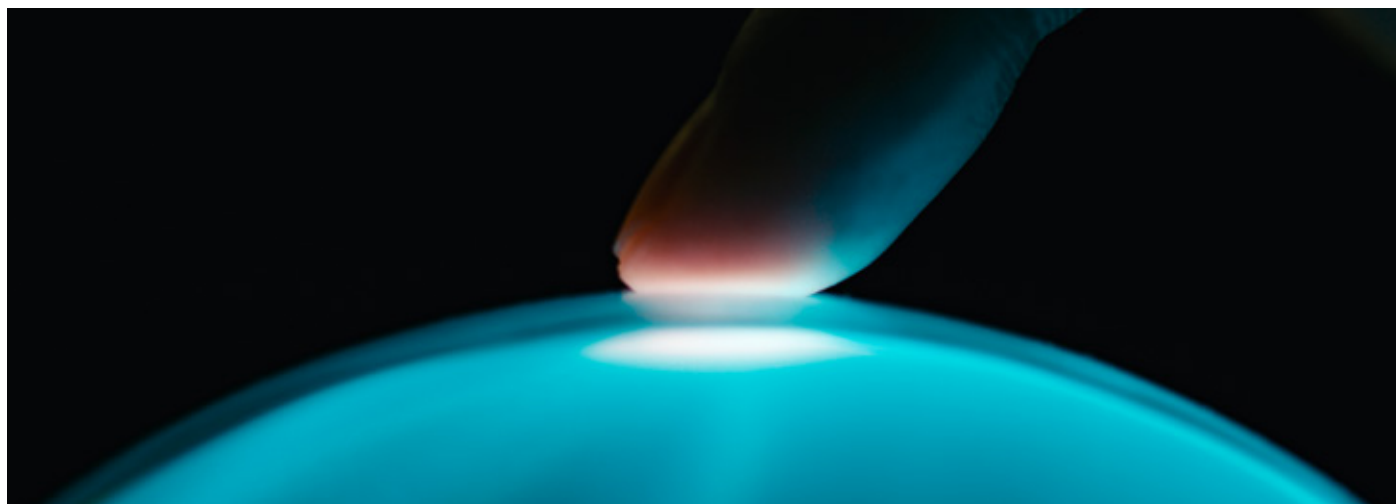
However, the development of large language models also raises important ethical and social considerations. One of the most significant concerns is the potential for these models to perpetuate biases and discrimination if they are trained on biased data."

The three paragraphs above are ChatGPT's answer when prompted, "Write an editorial about Large Language Models."

In the latest months, we have seen an increasing interest in LLMs, and for this reason, we have tried to make a bit more clarity around this topic. We wished to better understand topics such as how LLMs are used in research (if they are used at all), what their ethical implications are, and what the future looks like. We were thus motivated to decipher such a complicated topic, and what better than inviting our members to share their knowledge, experience, and thoughts on



Image by Midjourney, prompt by Fabrizio Martina



the benefits and risks of such technologies and how to adopt them with caution in our research activities.

The input from the authors who positively responded to our call for articles led to this issue, which covers a huge variety of topics. You will read about the history of LLMs, but also present and future implications for their development, such as data reuse. From a perspective of a researcher, aspects such as co-authorship, systematic reviews, and how PhD students make use of LLMs capabilities were highlighted. The authors also wrote about collective intelligence, breaking language barriers, inclusive society, and thoroughly discussed the ethical concerns of LLMs. You will also have a glimpse into further applications and how LLMs can be already used in healthcare, digital humanities, and project management, to name a few.

Moreover, as you are used to, this issue includes an update on the Association's recent activities, underlining, for example, the role of the MCAA in the EU Science Diplomacy Alliance, as well as explaining the importance of continuous learning and how the MCAA is supporting career development through its learning program.

In summary, this collection of articles detangles some of the most important research topics at the intersection of artificial intelligence and humanity and how

AI can shape our thoughts and decisions as researchers. Many questions on LLMs are yet to be answered, but we hope that after reading this issue, there will be some clarity on the topic.

As ChatGPT writes when prompted, "Write a 4-line poem on Large Language Models:"

"Machine learning at its best,
Language models ace every test.
Text generation, translation too,
Endless possibilities, all thanks to you"

We believe that the "human side" and our inputs will always be needed, and to correctly use these tools, we will need to make sure to understand their full potential, limitations, and solve the great variety of ethical concerns around them.

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News from the MCAA

The MCAA chairs the EU Science Diplomacy Alliance



The EU Science Diplomacy Alliance

Between 2016 and 2022, the European Union funded, under Horizon 2020, three projects aimed at studying science diplomacy from different perspectives.

InsSciDE explored the history of science diplomacy focusing on themes such as heritage, health, security, environment and space.

S4D4C aimed at supporting European science diplomacy in developing a governance framework to find solutions for global challenges.

EL-CSID had the objective to articulate the relevance that cultural, science, and innovation diplomacy have for EU external relations, underlining the limits of an excessively simplistic approach to them.

The Coordinators of S4D4C, InsSciDE, and EL-CSID together launched the **European Union Science Diplomacy Alliance** at the Final Networking Conference of S4D4C on 19 March 2021, with the support of several founding members. The Alliance is grounded in the results and networks fostered by the three projects and aims at sustaining the dialogue on EU science diplomacy and cultivating new opportunities to progress the theory and practice of science diplomacy in Europe.

The European Union Science Diplomacy Alliance is a collaborative initiative bringing together institutions active in science diplomacy research, policy advice, education, and more, aiming at fostering cooperation and capacity building among its members for effective science diplomacy advising. The MCAA, as one of the Members, is chairing the Alliance between January and June 2023.

The main objectives of the Alliance are:

- Facilitating collaborations on science diplomacy projects
- Developing a community of practitioners and a network of knowledge
- Advising science diplomacy stakeholders
- Training new professionals in the field of science diplomacy

The Alliance is open to new partners, who can belong to one of three groups:

- **Members** are based in the European Union
- **Global Networking Partners** are either based outside the EU or have a geographical focus that lies outside.
- **Advisory Partners** are involved upon invitation.

With the exception of the Advisory Partners, only institutions can be members of the Alliance, but it's the members of these institutions who make its heart and soul.



The participants at the EU Science Diplomacy Alliance meeting, held as a satellite event of the MCAA AC 2023

The Members of the Alliance rotate every six months in chairing it, allowing each member to bring their own expertise and vision to it. Before the beginning of the chairing term, the chair-to-be institution publishes a work program on the dedicated page of the Alliance website to define the objectives that it aims to achieve.


The MCAA chairing term


The Alliance has a trio-Chair system. Every six months, the current, past, and future chair is active in the Alliance. The Marie Curie Alumni Association has been chairing the Alliance between January and June 2023 and will continue to support it as the Past Chair till December 2023. The current Chair of MCAA, Fernanda Bajanca, and the Executive Director, Mostafa Moonir Shawrav, are the Co-Chairs of the Alliance. The aim of the MCAA, among others:

- Providing organizational stability
- Enhancing the collaboration among members and global networking partners
- Contributing to the European Science Diplomacy agenda & strategy development

Furthermore, many events have been planned for the semester, such as the General Assembly of the Alliance and a dedicated Satellite Event in the frame of the Annual Conference of the MCAA itself.

On February 23rd, the Alliance organized in Cordoba a Satellite Event to the Marie Curie Alumni Association Annual Conference, taking place in the following days. The Event was titled "The Past, Present & Future of the EU Science Diplomacy Alliance" and it aimed at collecting experiences and inputs from science diplomacy practitioners to draw lessons and ideas to strengthen the Alliance in the future. The audience was led through the journey that brought to the creation of the Alliance by its past chairs and received insights on the development of the European Science Diplomacy Agenda. Several researchers and practitioners shared their experience in science diplomacy from a multitude of points of view, sparking discussions and sharing engagement opportunities with the audience.

Federico Di Bisceglie 
ESR, INSA Toulouse

Mostafa Moonir Shawrav 
MCAA member

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The recording of the event "The Past, Present & Future of the EU Science Diplomacy Alliance" can now be found on the MCAA [YouTube channel](#).

News from the MCAA

The value of continuous learning: Insights from the MCAA Learning Programme

Career development and continuous learning are a core part of MCAA's mission. One of such activities is the MCAA Learning programme, which provides members with free access to Coursera. Board member Gian Maria Greco, who is currently co-developing the brand new MCAA Training Programme, has interviewed the two most active MCAA members on Coursera: Majid Al-Tae and Niki Stathopoulou.



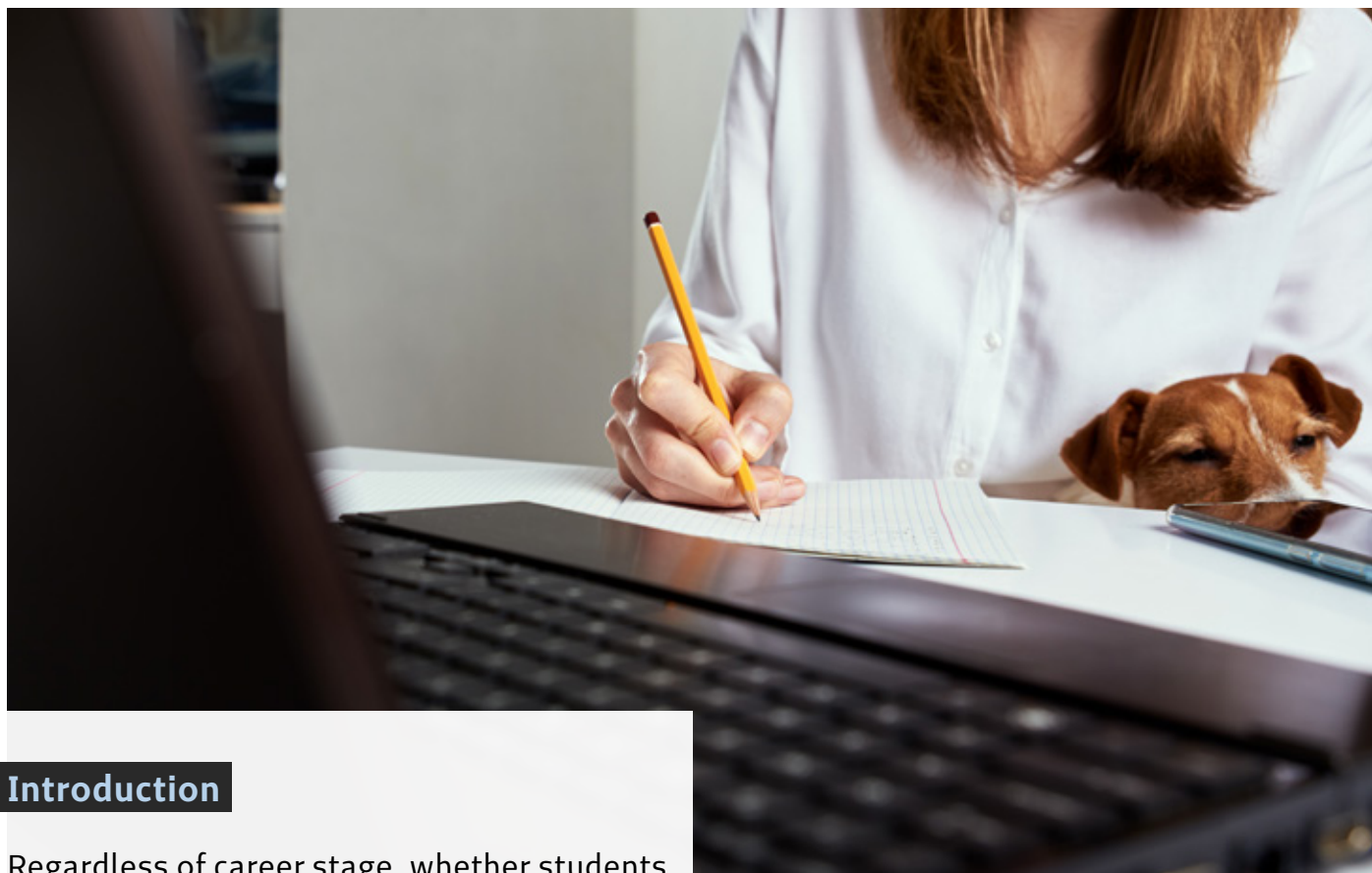
Majid Al-Tae, a personal account

I have a PhD in Electrical and Computer Engineering and over 20 years of academic and professional experience in Iraq, Jordan, and the UK. My research focuses on machine learning, e/mHealth, web and mobile applications, IoT, and systems control. I have been awarded numerous research grants, published over 150 papers, and received 10 scientific honors.

Niki Stathopoulou, a personal account

I hold a PhD in Psycholinguistics and Neurolinguistics and an MA in Computational Linguistics (University of Essex, UK), and two BAs in English & Linguistics (National and Kapodistrian University of Athens; American College of Greece). My research as a Marie Skłodowska-Curie Fellow (University of Bristol, UK) focussed on people with neurodevelopmental disorders.





Introduction

Regardless of career stage, whether students or established professionals, there is always a need to gain new skills and learn. This is the reason behind the MCAA Learning programme, which provides MCAA members with free access to the learning platform [Coursera](#). MCAA can choose among 7000+ courses from 275+ leading universities and companies, or enroll in the several learning tracks that the MCAA has designed with Coursera. Licenses are allocated in 3-month cohorts. Every 3 months a new cohort of MCAA members is given access to the platform. The first 2023 cohort concluded at the end of March, and we had a chat with the two top members in terms of performance: Majid Al-Taei, who made 182 hours over 11 courses, and Niki Stathopoulou, who made 113 hours over 81 courses.

What type of courses did you attend through the MCAA Learning programme?

Majid: I have completed four specializations in web design, web apps, search engine optimisation, and deep learning. In addition, I

am making progress in a range of courses on supervised and unsupervised machine learning as well as one on personality types at work.

Niki: Over the years, I attended various short courses by Coursera, such as general statistics, research and design, statistical programming, web development, computer programming (i.e., python), probability and statistics, data analysis, machine learning, data visualization, leadership, and management. Last year, which was the first time that I have been allocated a 3-month license through the MCAA Learning programme, I was able to complete a number of courses from top universities based on my research interests, that is, psychology, neuroscience, mental health, and medicine. Moreover, I obtained two Specialization Certificates: Medical Terminology from Rice University and Neuroscience & Neuroimaging from Johns Hopkins University.

How can those courses help you with your current job or future career plans?

Majid: These courses, which mostly focus on data science and machine learning, would broaden the extent of my experience, complement my technical skills, and improve my knowledge and productivity in the relevant aspects.

Niki: Being active in terms of acquiring new skills and learning new things at any stage of one's life is of utmost importance nowadays, as we live in a post-COVID era that prevails both competition and insecurity. Personally, I am open to new job opportunities as I was obliged in the past (for various reasons) to enter into a long period of career break. Thus, those courses enhance my personal development and offer me a window to visualize a better future.

Based on your experience, what are some problems and potential solutions with continuous learning?

Majid: The rapid sociological, economic, and technological advancements have made continuous learning a potent tool for both personal and professional development. Innovation, trying new things, and thinking outside the box all require ongoing learning to deliver cutting-edge performance and adapt to the changing world. However, this kind of learning demands motivation, tenacity, and readiness to face challenges due to the lack of in-person interaction.

Niki: Continuous learning can be a lonely task, especially if companies or institutions do not foster encouragement to their employees or students/researchers. This could be alleviated by creating a supportive environment and establishing a personal development plan that encourages people to engage in continuous learning. The MCAA, by providing its members with free access to the learning platform Coursera, promotes

continuous learning and boosts its members - irrespective of their career stage - to engage in learning new skills.

What is your opinion of the MCAA Learning programme? Do you have any suggestions for its future development?

Majid: The MCAA learning programme, in my opinion, is a trailblazing initiative that advances the goal of MSCA by helping fellows advance their careers further. I am extremely grateful to the MCAA for offering me the opportunity to use the Coursera platform and acquire new knowledge and skills. To better serve more MCAA members and extend the three-month cohort term, I suggest speaking with Coursera about the possibility of splitting the access license into two or three shifts. This enables the enrollment of multiple cohorts concurrently, allowing them to access the platform at various times throughout the day.

Niki: I think that the MCAA Learning program offers a new learning experience. The MCAA members can enroll in a wide range of courses that are organized into different categories. As there is always room for improvement, I would be happy if I see more courses on language learning, especially at the advanced level.

To reward Niki and Majid for their extraordinary engagement with the MCAA learning tools, their Coursera licenses have been extended for another 3 months. To request access to MCAA Learning, check this [webpage](#).

Gian Maria Greco 

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Special Issue

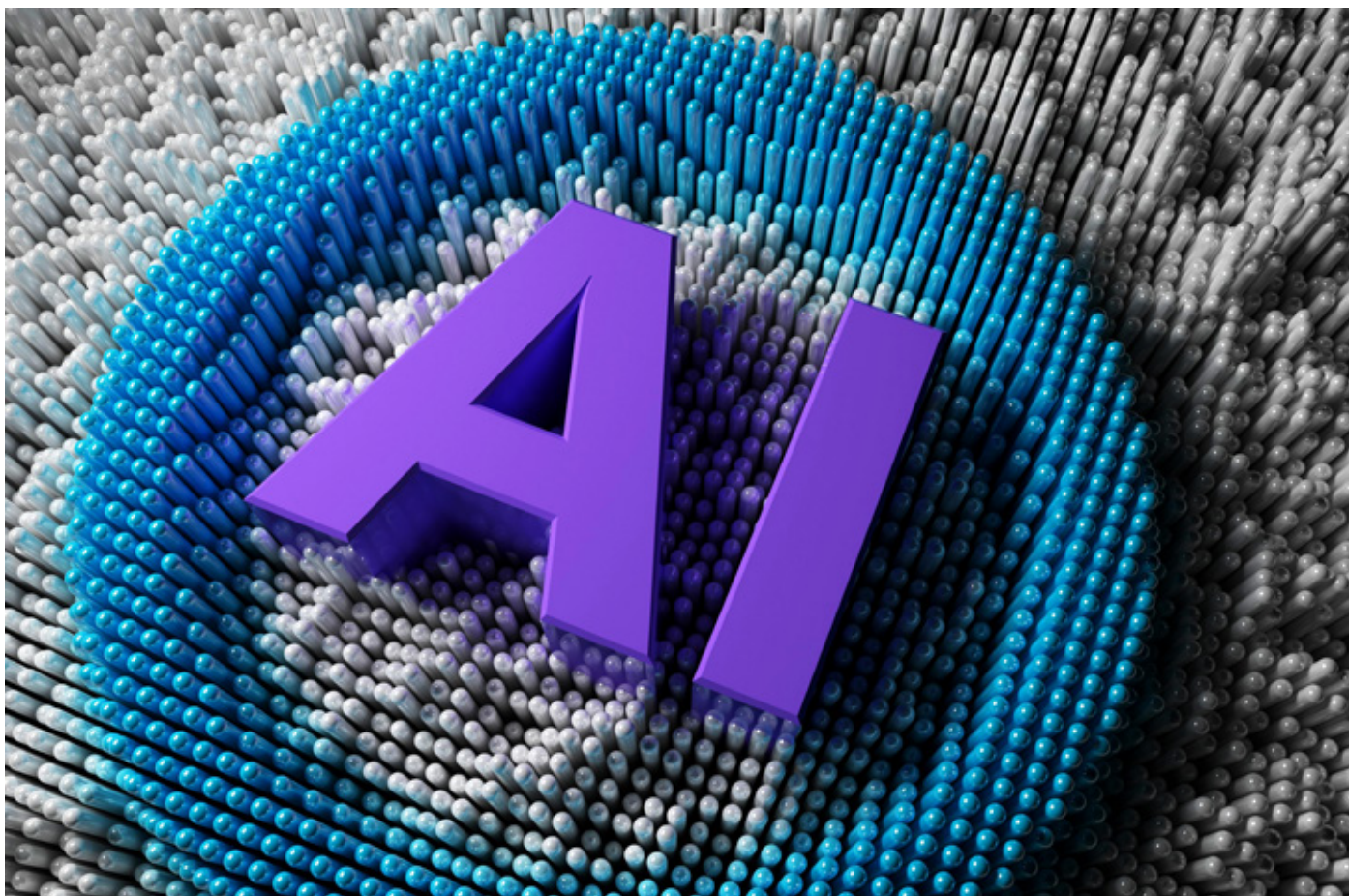
Interview to Iacer Calixto: The role of natural language processing and large language models in healthcare

Nicoleta Spînu, the vice-Chair of the Communication Working Group, interviews Iacer Calixto about where the natural language processing (NLP) and large language models (LLMs) stand at present and their role in healthcare. Iacer Calixto is an assistant professor of artificial intelligence (AI) in the Department of Medical Informatics at the Amsterdam UMC, University of Amsterdam. There, he investigates methods based on machine learning (ML) and NLP, including the incorporation of vision and world knowledge for problems in medicine and psychology.

What are NLP and LLMs and are these computational methods any different from machine learning and deep learning?

Artificial Intelligence or AI has to do with intelligent algorithms. In machine learning, a specific type of AI, we train a model to perform a task for which we need data to teach the model. Deep learning is machine learning with neural networks, roughly speaking. NLP uses machine learning for human languages. Most of the time, we are referring to written text and language, but we can also think of speech processing. Thus, NLP is part of AI and part of ML. It refers to the development of models to understand and generate language. By





understanding a language, we mean to be able to read a text and make sense of it in a very broad sense in order to solve a task or recommend something, to make a prediction, or to establish a correlation. By generating language, we mean to generate an answer to a question, for example, or to generate a translation for a sentence. Large language models are the latest development in the NLP field. They are large neural networks with a specific model architecture that are trained on vast amounts of data. Until recently, this was raw text. Nowadays, most of them are running on proprietary knowledge, and we don't know how much data were used. Some say that it can be in the order of magnitude of trillions of tokens. Also, LLMs can have many billions of parameters. Thus, LLMs are very large in terms of parameters and data they consume. This is roughly what GPT4 is - it can do very intelligent tasks for us, but at the same time, it still makes silly mistakes a child would not.

What kind of problems can NLP and LLMs be used for to solve in healthcare?

In the context of a hospital such as Amsterdam UMC, there are plenty of free texts available written by physicians, nurses, therapists, and other healthcare professionals. These free-text data, however, are messy and not good for clinical decision-making. One obvious task NLP can do is to structure such data into a FAIR format, i.e., Findability, Accessibility, Interoperability, and Reusability, which has to do with data quality. Every organization, especially in healthcare, strives to follow these principles, and NLP can be used to make sense of these messy free-text data and structure it FAIRly. In addition to that, NLP can be applied to any medical speciality, for example, in primary care, where general practitioners are used to writing notes. Another example is in radiology, generating reports from medical images to aid radiologists. Also, free-text

data are available in Electronic Health Records (EHRs), and such data are useful in predicting the risk of patients for various conditions and diseases. One project we work on in our department focuses on the development of models to predict the risk for falls in elderly patients in the hospital. We employ NLP to test data to help clinicians identify patients at risk for falls. It is difficult to track the falling itself as it can be affected by different factors, such as medication. We also develop models to predict risk for cardiovascular disorders and different types of cancer. Lastly, NLP can be useful in patient phenotyping to identify patients with a specific condition or just before the onset of the condition.

What are the crucial aspects of the development of NLP and LLMs for real-world applications?

Development of NLP / LLMs models is a team effort. It requires synergy. Clinicians usually provide the question and the clinical context and relevance of the problem to be solved. A modeler might not actually know or easily identify problems such as the falling case I referred to above, which was for me. The biggest bottleneck remains to be the data. In healthcare, data are difficult to combine besides having access to high-quality data. For example, we don't have enough data on rare diseases by design. When it comes to the NLP pipeline, you need to tailor it to the problem and there is still a need for modeling knowledge. Using LLMs, computational power becomes an issue but also, the interpretability of these models, understanding of what they do and how they provide the outcomes. It can be the case that a rather simple model, e.g., a logistic regression, can be of better use to help clinicians.

What are the biggest challenges in the development of NLPs and LLMs in healthcare at the moment?

One big issue remains to be the interpretability and explainability of such models. Nowadays, even by law, you are required to provide a certain level of transparency for a model to be considered fit for implementation. Another challenge is the validation of a model. High-quality data are hard to get access to and combine. The procedures take a very long time, e.g., up to a year, to have internal and external validation sets. Thus, access to data remains a big impediment and hinders advancements in healthcare research in general.

Could you tell us more about your research interests and projects you are investigating at present?

One research topic of my interest is synthetic data generation. We don't have enough high-quality data, and getting access is very difficult for various reasons, including data protection regulations. In healthcare, everyone is protective. I believe in openness, and one way to solve this is by developing methods to generate synthetic patient data, including not only neat structured variables but also free text. Besides that, a project that I work on includes identifying patients with a high risk for different types of cancer-based on free text notes written by general practitioners in primary care using methods such as prompt-tuning. Another project involves the prediction of acute kidney injury in intensive care using longitudinal data and linking publicly available knowledge bases in partnership with a publishing company. In mental health, we develop NLP methods using social media data to flag the risk for specific mental health issues. These are models that can very easily allow you to forget information about a specific user if you need to.

What about your implications in the European Union-funded projects such as the IMAGINE and the Multi3Generation projects? What

were the main outcomes? What kind of impact did such experiences have on your scientific career?

The IMAGINE project was an MSCA Global Fellowship, a personal grant to do my own research. It funded me for just under three years. I spent the time visiting New York University, where I worked on grounded language models (Calixto et al., 2021), vision and language (VL), and a novel benchmark designed for testing general-purpose pre-trained VL models (Parcalabescu et al., 2022).

Multi3Generation is a COST Action type of project where I was one of the initiators. It is a network of researchers who are interested in a certain topic, and it involves various European partners. My roles were short scientific mission leader, where I had the chance to oversee research visits and learn about what other colleagues work on. A survey on natural language generation conducted within the consortium is publicly available (Erdem et al., 2022). Currently, I am a Management Committee Member for the Netherlands.

Both the IMAGINE and Multi3Generation projects led to many fruitful collaborations, and some of those are still ongoing.

Any final thoughts to the MCAA members?

My recommendation is to stay away from the hype and choose to focus on what you do and do it well. On the other hand, as an academic, it is difficult to compete with tech companies head-to-head. If we want to train models, we don't have that scale and capabilities. Choose wisely with whom to collaborate and the problems to work on.

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Special Issue

Generative tools using large language models and translation

Thousands of articles and think-pieces on generative machine learning tools such as ChatGPT and GPT-4 have appeared in recent months. A very unscientific perusal indicates that many are enthusiastic – these tools are undeniably impressive – but in the more critical pieces, themes of work displacement, alignment, and data reuse are prominent. In this short article, I want to briefly address these topics, in turn, from the perspective of a researcher in translation studies.

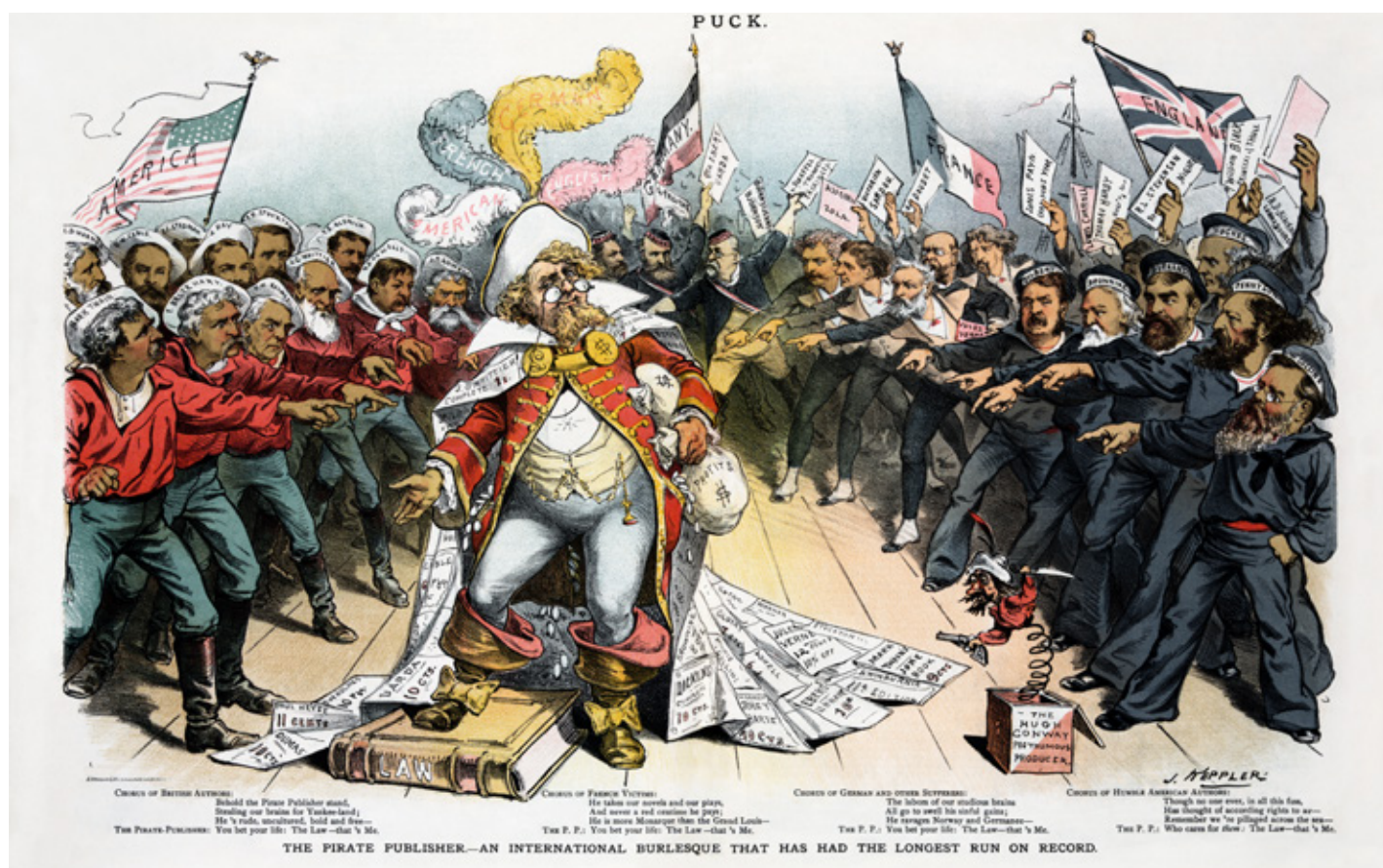
In 2017, Frey and Osborne predicted that 47% of jobs in the United States would be at risk due to 'computerisation.' More recent work, such as that by Felten et al. (2023), talks of 'exposure' to generative artificial intelligence (AI), with desk-based, cognitive work coming near the top of the list. However, translation has been exposed to machine learning tools trained on large amounts of human-created data for some time in the form of neural machine translation (NMT), and the effects have been mixed. Automation is not all-or-nothing: we see portions of translation work being replaced, portions augmented, and some tasks decomposed to small chunks to fit with what machines can be trusted to do. The rule of thumb is that the level of automation should relate to the shelf-life and value of the content along with the level of risk in

case of mistranslation (Guerberof-Arenas & Moorkens, 2023; Way, 2013). There are times when a focus on cutting (labour) cost has led to the overuse of NMT, resulting in the exposure of end users to risk or to unhappy workers who are underpaid to tidy up poor-quality NMT output. A lesson that should be learned for other occupations that will be affected by AI is that we need sustainable work systems, in which intrinsically motivating work maintains the satisfaction and interest of workers.

At the time of writing, many companies are scrambling to find uses for generative tools to add to their offerings. Discussion of alignment of these tools with human needs is necessarily retrospective, as they were not built to directly address human needs, but rather because developers could, following a trajectory of supervised and unsupervised machine learning to maximize specific performance indicators (such as translation of decomposed sentences, text summarisation, or semantic evaluation). This means that we are gradually finding out what they are capable of, such as solving complex tasks in mathematics, coding, or vision, while occasionally failing at basic arithmetic

Joss Moorkens, a personal account

Joss Moorkens is an Associate Professor at the School of Applied Language and Intercultural Studies in Dublin City University (DCU), leader of the Transforming Digital Content group at the ADAPT Centre, and member of DCU's Institute of Ethics, and Centre for Translation and Textual Studies. He has authored over 50 articles, chapters, and papers on translation technology, evaluation, and ethics. He is General Co-editor of Translation Spaces journal and coauthor of Translation Tools and Technologies (Routledge 2023). He jointly leads the Technology working group as a board member of the European Masters in Translation network.



The Pirate Publisher. From Puck Magazine in 1886 around the time of the Berne Convention. Illustration by Joseph Ferdinand Keppler, Restoration by Adam Cuerden.


or miscounting words (Bubeck et al., 2023). Research so far indicates that translation quality from generative tools is competitive with NMT for well-resourced languages (Hendy et al., 2023), with promising consideration of context (Castilho et al., 2023) and automatic translation evaluation (Kocmi & Federmann, 2023). We are likely to see these tools replace NMT for some use cases. NMT's problems of hallucinations (inexplicable incorrect output) and bias (gender or racial) affect generative tools too. A concern is that hype and too little concern about ethics and sustainability will lead to the use of AI tools in inappropriate circumstances. Literacy about how they work and the data that drives them will be increasingly important. The problem remains that the internal workings of machine learning systems are opaque, meaning that we can't interrogate choices and decisions from systems.

Finally, generative tools are based on huge amounts of data, much of it scraped from the internet. Web data has been widely used for NMT training for many years, but the hype around generative tools has stirred up new interest in training data, particularly from authors and artists who are unhappy with their text and images being used. The reuse of data for MT or for text generation is difficult to reverse engineer, as texts are broken down to words and subword chunks in NMT training, making the output difficult to recognise. However, recent work by Chang et al. (2023) found that ChatGPT and GPT-4 had been trained on copyrighted material from books. While web scraping is generally considered acceptable by developers, there are likely to be many publishers who will try to block the use of their materials as training data. The automatic generation of text is likely to cause further data issues. How much new

web content will be automatically generated? Differentiating useful from useless data will be difficult. It's been a problem for MT developers scraping multilingual data from the web for some time. Can we avoid the ouroboros effect of feeding AI tools their own output?

These are not the only challenges in integrating generative tools into our lives and work. But they have been part of the translation industry since at least 2016 and addressing them has been painful at times. Portions of the industry have been hollowed out, leading to claims of a 'talent crunch' in subtitling, for example, where pay rates have dropped and many talented workers are leaving the industry (Deryagin et al., 2021). It would be disappointing (if not entirely surprising) to see the same mistakes made


in other fields. As we discover more about the abilities of generative tools and their capabilities improve, there should be great opportunities for their ethical use. To worry about unethical uses or their potential to widen the growing digital divides is not to ignore current and future capabilities. To quote Meadows (2008, pp. 169–170), the hope, ultimately, is that we might discover how the system's "properties and our values can work together to bring forth something much better than could ever be produced by our will alone".

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Special Issue

ChatGPT: A co-researcher?

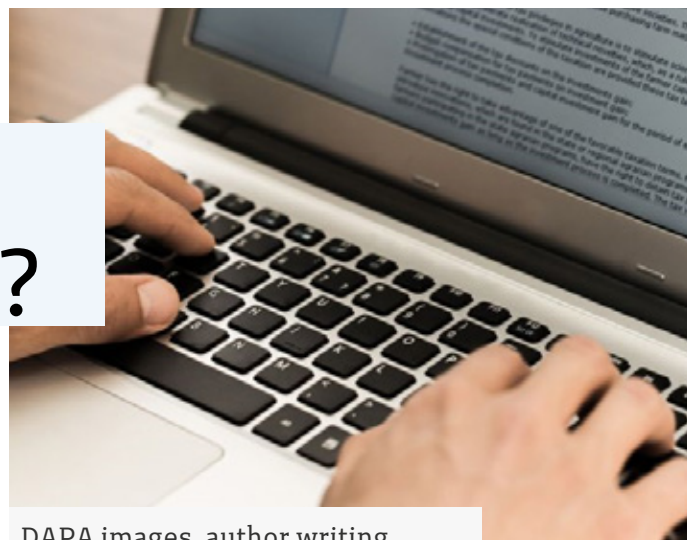
ChatGPT has officially entered our everyday dictionary, but adoption is more challenging in research. Should we consider ChatGPT as just a tool? Or perhaps something more?

ChatGPT was released in November 2022 and has since exploded in popularity, reaching 100 million users in just two months. In the first week, I received emails and messages from colleagues and friends about how to best introduce it into their work environment. It was apparent to everyone that ChatGPT and LLMs (Large Language Models) in general, were in the spotlight, and people were not shying away from them. ChatGPT has even gotten at least four authorship credits, sparking a debate between journal editors, publishers, and researchers on using LLMs in research articles, specifically in its author and researcher status.

After all, why not? Why shouldn't I use it?

Research and writing are full of tasks that an LLM can speed up. ChatGPT can help with the language and the style of research articles. It can help authors improve their writing and editing and provide structures that make the content of the research article more precise. In addition, it can accurately summarize parts of their research and speed up the process of writing papers by removing the need for time-consuming tasks. ChatGPT can even provide fresh ideas and a new set of eyes, providing researchers with new avenues to explore.

Or at least these are some of the main ideas behind its use in writing a research article.



DAPA images, author writing

Photo by Canva.com

However, the truth is that at the moment, while extremely useful in specific tasks, LLMs are still unreliable as an out-of-the-box solution. A researcher would need to spend a considerable amount of time double-checking all the outputs of ChatGPT to ensure that no false information makes it through the cracks to the published text of a research paper.

A response from journals and publishers.

Publishing research papers with ChatGPT as a credited co-author has led some of the most prestigious publishers to explicitly announce that they will not accept it as a co-author in their journals. For example, a publisher has updated its guidelines, stating that ChatGPT

George Balaskas, a personal account

George Balaskas is an MSCA PhD fellow at the National Centre of Scientific Research "Demokritos". He is part of the Health CASCADE project, aiming to make co-creation trustworthy. He has a BSc in Computer Science and Artificial intelligence and an MSc in Artificial Intelligence from the University of Sussex. His focus is on Deep Learning and Natural Language Processing. He is currently working on employing Transformer models to enable and speed up co-creation.



Photo by Canva.com

Peshkov, AI and future concept

can no longer be listed as an author in its nearly 3,000 journals. However, its use is not outright prohibited as long as the authors that use LLMs document their use in the methods or acknowledgments section if appropriate. Another publisher has also adopted a similar stance and will allow LLMs if the authors declare how they have been used. Finally, Holden Thorp, editor-in-chief of Science, said: "Given the frenzy that has built up around this, it's a good idea to make it explicit that we will not permit ChatGPT to be an author or to have its text used in papers," [1] banning its use from the journal.

If not an author, then what?

To be an author in a research paper means to have ownership of the research that has been conducted. Ownership comes with accountability and responsibility for the validity and integrity of the work. Magdalena Skipper, editor-in-chief of Nature, said: "An attribution of authorship carries with its accountability for the work, which cannot be effectively applied to LLMs." Additionally, most journals and publishers require authors to consent to terms of use, which is impossible for an LLM to do. If LLMs cannot consent to terms of use, cannot be held accountable for the validity of their work,

and cannot consent to be an author. Then the only possible avenue other than an outright ban seems to be disclosure. The researchers have to make sure that the journal they are interested in allows the use of LLMs, and if it does, they have to carefully document, disclose and acknowledge their use of LLMs.

To conclude

While ChatGPT can undoubtedly be a valuable tool in the research process, it is unlikely that it should be credited as a co-author. While it can contribute to the writing process, it lacks the critical evaluation skills and personal experience necessary for true co-authorship. Additionally, the potential for bias and flawed data is a concern that should not be overlooked. Finally, an LLM cannot take legal decisions or be held accountable for its production.


Ultimately, it is up to individual researchers and institutions to decide how best to acknowledge the contributions of ChatGPT and other AI tools in their academic works, whether as a simple tool or a co-researcher. Publishers adopted a common front. However, it is a rapidly evolving field, and future improvements will likely raise the question again. If chatGPT can write a whole paper alone one day, will it still be only a tool?

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Special Issue

ChatGPT: Unlocking the true potential of collective intelligence



Photo by Canva.com

Blue Planet Studio, AI Learning and Artificial Intelligence Concept – Icon Graphic Interface showing computer

Are we using the full potential of chatbots? While they're commonly used for everyday tasks, they could also be the key to unlocking the power of collective intelligence to solve complex problems.

Chatbots like ChatGPT are revolutionizing our daily work and life, but are we using them to their full potential? In this article, we'll explore how chatbots can be used to overcome the limitations of collective human intelligence in solving complex problems and how the EU MSCA ITN project Health CASCADE ([CORDIS: 956501](#)) is developing chatbots specifically for co-creation and hybrid collective intelligence.

Facing complex existential problems

Humanity faces unprecedented challenges that threaten our welfare and even our existence. Climate change, population aging, social inequalities, and pandemics are complex problems that seem to resist our best solutions. These problems are too entangled and have too many moving parts for any one person or discipline to solve.

Sebastian Chastin, a personal account

Sebastien Chastin is a Professor of Health Behaviour Dynamics in the School of Health and Life Sciences at Glasgow Caledonian University and in the Department of Movement and Sports Sciences at Ghent University. He received BSc in metrology and applied physics, a Master in Applied Physics, a Master in Rehabilitation Sciences and a PhD in Non-linear physics. Previously, he had posts at the British Antarctic Survey, Oxford and Edinburgh University. His research focuses on the dynamics of health behavior concerning aging, places and systems. Understanding why, when, and how people decide to move or not is crucial to promoting healthy movement behavior and aging. Sebastien works on co-creation and collective intelligence methods informed by data science and supported by technology. He coordinates the Health CASCADE Marie Skłodowska–Curie ITN on co-creation methodology. Sebastien is passionate about European Mobility and Research. His career is the result of taking part in one of the first ERASMUS exchanges.



piranka, Creative team working

They require collective intelligence and the co-creation of actions that involve diverse perspectives, expertise, and approaches. But how can we bring together the diverse knowledge, experience, and perspectives necessary?

The limits of collective intelligence

From ancient societies to modern-day corporations, collective intelligence has been a valuable tool for harnessing the power of group knowledge and experience. However, despite the many successes of collective intelligence and co-creation, there are still limits to what they can achieve, particularly when solving complex problems. Some of these limits include:

- **Groupthink:** It happens when group members, pushed by a strong desire for cohesiveness or poor coordination, make

irrational or inadequate decisions for harmony and conformity.

- **Cognitive biases:** We all have biases (e.g., confirmation bias, self-serving bias) that we bring to the table, whether we are aware of them or not. These biases can prevent us from seeing the complete picture or considering alternative perspectives, limiting collective intelligence's effectiveness.
- **Difficulty in communication:** Achieving mutual understanding and effective communication is crucial for collective intelligence. Yet, humans often struggle with these aspects because we work in silos.
- **Limits of the human brain:** Whether we like it or not, our capacity to process information is limited. Notably, we can't synthesize large amounts of information and grapple with the scale and interdependencies of complex issues.

Exciting Chatbots for Collective Intelligence

Chatbots can help us overcome many of these limitations. Imagine a chatbot being an integral part of a co-creation team, like the artificial intelligence system on the starship Enterprise in the Star Trek series. In Star Trek, the android known as DATA assisted the crew in thinking through complex problems, ultimately helping them survive their adventures and thrive.

Chatbots can now gather, organize and summarize information from multiple sources and present it in an easily digestible and understandable format for different users. So, the co-creation team can access up-to-date and exhaustive knowledge and evidence base. Co-creation teams can use chatbots to stress-test their ideas and quickly produce digital prototypes and simulations. In addition, chatbots can also help to mitigate cognitive biases by detecting them, challenging points of view, and triggering reflection. Chatbots can listen and summarize discussions helping co-creation teams communicate better. This can help to overcome silo working and promote mutual understanding. Finally, chatbots can help with governance and prevent groupthink, encouraging diversity of thought and ensuring that all voices are heard, regardless of status or hierarchy within a group.

Not quite there yet


While chatbots have enormous potential to enhance collective intelligence, there are still several areas that need to be addressed to realize their potential fully:

- **Quality and bias-free sources of information:** It is crucial that Chatbots learn from high-quality and free from biased information. Otherwise, the chatbot could perpetuate false information and undermine the collective intelligence process.


- **Understanding and adapting diversity of skills, views, and expertise:** Chatbots need to be designed to recognise and appreciate differences in skills and opinions to ensure that all perspectives are considered in the decision-making process.
- **Transparency, Privacy and data protection:** There is a need for strict regulations and guidelines to ensure that data is protected and that privacy and transparency are maintained.
- **Customisation and flexibility:** Chatbots should be designed to be flexible and adaptable to different co-creation team needs.


Conclusion

Chatbots can augment and guide the co-creation teams and unleash their full collective intelligence potential. This is probably the most significant contribution that chatbots can make to humanity. However, we must design them for this purpose and learn how to integrate them as part of co-creation teams best. We are investigating this with www.healthcascade.eu.

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Special Issue

Dialogues and transfers: The (po)ethical-practical rescue of the Digital Humanities

The Digital Humanities impel us to examine AI as a potential and conceptual aid to science and society. In this respect, they can promote a conciliation of languages, with a focus on the idea of ethically 'outgrowing' the definition of human societies:

**"Thinking is not unifying
or transforming an appearance
in familiar.**

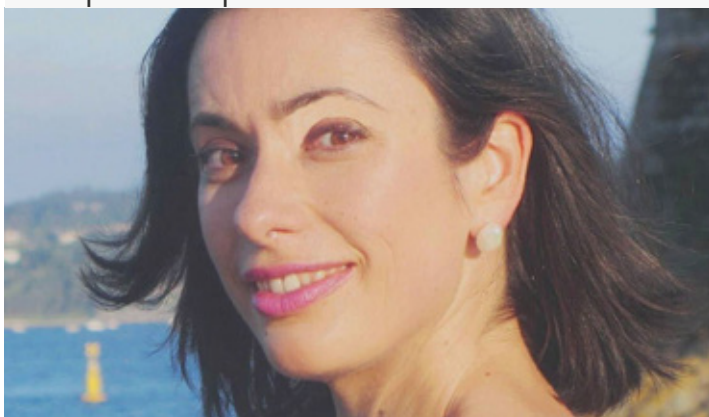
**Thinking is directing
one's own consciousness
transforming each image
in a privileged place."**

Albert Camus

When discussing Artificial Intelligence (AI), we seldom consider the enriching potentialities of the Digital Humanities as a conciliation of languages, but, as Claude Bernard reminds us "what we think we know prevents us from continuing to discover." Indeed, AI can reveal overlapping folds of reality neglected by our own perceptions. This would work in similar ways as René Magritte's art, where the artist ponders that 'everything we see hides something else. We always want to see the hidden through the visible, but it is impossible.' Writers such as Jorge Luis Borges could bring clarity in this quest by inviting us to see 'History not as an inquiry into reality, but as its origin.' In that respect, the language of the Humanities and the Arts, with all their intuitive variety and depth, could take us closer to a (po)ethical understanding of AI that is required for our ongoing societal dialogues.

Cristina Blanco Sío-López,
a personal account

Cristina Blanco Sío-López is a 'María Zambrano' [Senior Distinguished Researcher](#) at the University of La Coruña (UDC), Spain and **Principal Investigator** of the 'FUNDEU' project, financed by the **NextGenerationEU** framework. She is also the [Principal Investigator](#) of the EU Horizon 2020 research project 'Navigating Schengen: Historical Challenges and Potentialities of the EU's Free Movement of Persons, 1985-2015' (**NAVSCHEN**). From 2019 to 2022 she was **Marie Skłodowska-Curie Senior Global Fellow** at the University of Pittsburgh (Pennsylvania, USA) and at the [Ca' Foscari University of Venice](#). She previously was Assistant Professor in European Culture and Politics at the University of Groningen and '[Santander Senior Fellow](#)' in Iberian and European Studies at the European Studies Centre (ESC) – St. Antony's College of the University of Oxford, where she remains a Senior Member. She was [Chair](#) of the North America Chapter of the MCAA, which received the 'Best Non-European Chapter Award 2020'.



Outgrowing the Technium and the Sensorium

So, how can the Digital Humanities help us? They could contribute by aiding us to reverse engineer from apparent 'nothingness' as critical analyses take heart in the elucidation of intentions, purposes and meanings. The Humanities also bring about the fundamental concept of 'outgrowing' into the future. This evokes Kevin Kelly's **Technium** notion, understood as 'a complex organism with its own motivations' (Kelly, 2011). Taking into account this daring premise, the question arises as to how to build bridges with dialogues that involve human societies. And, also, could Digital Humanities provide a practical rescue before these challenges. David Eagleman maintains that 'our **sensorium** is enough for us to live in our ecosystem, but

it does not go beyond' (Eagleman, 2016). One solution could be to transform problems and challenges into questions by allowing transversal perspectives. This could help us create new narratives with interdisciplinary languages of circularity.

AI for the common good?

Luciano Floridi's **OnLife** offers answers from the field of Philosophy, centered around the pillars of **Paideia**, meaning education and knowledge and of **Nomos**, i.e., law and justice (Floridi, 2015). However, these basic pillars do not seem to be enough either, as there is a need for an AI ethical leadership. This is positively linked to the potential of a cooperative design of new languages of knowledge that are not excluding or exclusive.



Street Art mural illustrating AI design by bringing together Art and Science. 'Shoefitr mural' by Will Schlough in South Oakland, Pittsburgh. Photographed by Cristina Blanco Sío-López.

Indeed, it is not so much about managing information online as it is about how we tell human stories. In this sense, AI languages could be 'borrowing the future to offer opportunities to the present,' in Floridi's words. His **OnLife** implies a permanent connection, which begs the question of how to deal with the 4th Industrial Revolution in an authentically human way. This takes into account the challenges on how AI 'separates action from understanding' and how it is 'reproductive and not cognitive' (Floridi, 2015).

New questions for new languages


Considering the contributions of Philosophy, confronting these challenges would entail consciously researching technological human beings and human machines inhabiting our present-future. This new realm provokes newer questions: What new knowledge do we need to become cooperative and inclusive societies? What new pedagogies and policies are necessary to explain upcoming societal changes? In short, we are called to exercise a decision-making power that does in fact collectively empower us.

As Karelia Vázquez emphasized, it all comes down to 'the self-esteem of the human' in a way that we rescue a willingness to decide who we want to be. She also admonishes us not to 'be infected by the voracity of the algorithm' as humans are not an algorithm either (Vázquez,

2022). A way forward could then be defined by a commitment to stating our own rules and to reaffirm who we are - contradictory human beings, capable of lateral thinking and open to imagining parallel realities, as the Humanities invite us to consider.

Conclusions

Significant solutions for the challenges posed by this turning point can be based on algorithmic audit and transparency, as Lucía Velasco suggests (Velasco, 2023). In a similar vein, Peter Railton indicates that AI also carries significant risks of harm, discrimination and polarization (Railton, 2020). So, in order to minimize these risks, we must make sure that these partially intelligent systems become adequately sensitive to the characteristics of ethically relevant situations, actions and results, both in their relationships with humans and each other. In the end, it is up to us to create new inclusive languages of knowledge. More than a task, this will be a joyful gift of committed co-creation.

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Special Issue

When machines and humans speak the same language: ChatGPT breaking language barriers

Yes, I had to use ChatGPT to write this article. Use is a strong word when it acts more like my PhD supervisor. So, co-authors maybe... 2nd author though. In this little exploration, we'll ponder some fascinating use cases and scenarios for how LLMs could be woven into our current systems. Now, let's dive into a world where machines get us.

When machines just "get" us

You might have experienced moments of frustration when talking to Siri or Google Assistant, and they don't understand your request. Most of these systems are trained to listen for specific phrases. LLMs offer hope in developing systems that can generalize and understand a wide range of requests. ChatGPT is built on top of such a model.



Coding languages were created to communicate with machines that understand binary code. Over time, we developed languages that were more natural language-like (e.g., Python) and even visual block programming (like Scratch). With a language model that makes machines understand us, the need for traditional coding languages might diminish. I mean, why bother memorizing Excel commands when you can just tell GPT4 "sum of all the entries if the number is divisible by 3, in the next column up till 12th row" and have GPT4 spit out "=SUMPRODUCT(C1:C12, (MOD(C1:C12, 3) = 0))"? Yes, it really did that! The same is true for the command line.

Prajwal DSouza, a personal account

Prajwal DSouza, a doctoral researcher at Tampere University's Gamification Group, has an interest in creating interactive web simulations and games that simplify complex scientific and mathematical concepts. His current work focuses on developing gamified VR applications in bioinformatics and statistics to improve public understanding. Most of his projects can be found on his [website](#) including [those](#) exploring the potential of AI through reinforcement learning. His work embodies his passion for connecting diverse ideas and fostering learning through innovation.

In the short term, this might be the first application of language models. Natural Language to short coding instructions. But this also raises questions for coding education. Do we need to teach kids coding? Isn't the goal of coding to teach computer science? And at the end of the day, isn't learning computer science about understanding syntax and structure, not the coding language itself?



Newton's first law states that an object will remain at rest or in motion at a constant velocity unless acted upon by an external force. This concept can be explained using the metaphor of a game of thrones.  

Imagine that an object at rest or in motion is represented by a character in the game of thrones. Just as an object will remain at rest or in motion unless acted upon by an external force, a character in the game of thrones will remain in their current state unless acted upon by an external force, such as the influence of another character or the events of the story.

For example, a character who is at rest, such as a member of the Night's Watch stationed at the Wall, will remain at rest unless acted upon by an external force, such as a threat from beyond the Wall or a betrayal from within the Watch. Similarly, a character who is in motion, such as a traveler making their way across the kingdom, will remain in motion at a constant velocity unless acted upon by an external force, such as an encounter with hostile forces or adverse weather conditions.

In the game of thrones, the external forces acting on the characters can be complex and unpredictable, leading to changes in the characters' states and trajectories. Similarly, the external forces acting on an object can be complex and unpredictable, leading to changes in the object's state and motion.

Overall, the concept of Newton's first law can be thought of as a game of thrones, in which an object will remain at rest or in motion unless acted upon by an external force, just as a character will remain in their current state unless acted upon by an external force.

ChatGPT (3.5) Prompted with: Explain to me Newton's first law in terms of Game of thrones.

But in the long term, this could lead to more advanced applications. What happens when we can request a longer code? Not only can language understand our requests, but they can also generate content in other languages, like code, to execute tasks. Imagine this: you want to play a game where birds are launched into magnificent structures infested with relaxed pigs. Sure, you could search for the app store and download it... but what if your OS could just generate that app or game for you? I mean, isn't the app store basically a code repository anyway?

LLMs can "understand" language, but the code/text generation side of it can go even further with personalization. Imagine reading this article, but it's tailored to your interests.

Or picture a quantum mechanics course peppered with references to a TV show, chicken steak, and whatever else appeals to your interests. Dynamic, interactive textbooks might become the next thing.

When Machines Chat Like Colleagues

One of the biggest problems in developing applications is choosing the correct language. A program written in C# cannot be easily translated to Python, or a program written by one developer cannot easily communicate with another, especially when in different languages and frameworks. But what could happen when a machine can seamlessly translate code? Imagine a group of bots having a "Zoom meeting" on


the topic "How can we solve the problem of climate change? - A workshop". This sounds like a parliamentary session. What happens when government advisers are a group of LLM agents monitoring the economy, having virtual workshops? In fact, a company in China is reported to have an AI CEO and is doing better than its competitors.

What happens when a group of AI bots understand and correct each other, assign roles, and execute the tasks on their own? AutoGPT is one such tool. I can simply place a general request that I want to write a research article, and it could write one browsing the web and reading various articles. Systems that speak different languages may finally be able to speak to one another easily.

But there's more! What if we could give an LLM a task to read a set of research papers and come up with hypotheses, like when Tony Stark talks to Jarvis in Avengers? Could LLMs help us with research? Well, they're getting there. I recently used ChatGPT (running GPT 3.5, not GPT4) to help with a step of my systematic literature review, and we agreed

on 80.4% of the abstracts we filtered through. Performing a full systematic review should be possible with tools similar to AutoGPT that are fine-tuned for literature reviews. With plugin support for ChatGPT, this should be easier and maybe perform much better with GPT4.


Of course, there are limitations to GPT models, especially when it comes to accuracy and reliability. We need to iron out these wrinkles before we can fully embrace the potential of this tech. But for now, I like to think of us humans as the chefs in this AI kitchen, guiding our robot sous-chefs as they whip up tasty treats and execute routine tasks.

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Special Issue

Proceed with caution: The potential negative impact of AI on scientific research

As scientists, we are constantly exploring new tools to advance our research. One of these tools that is very popular in recent years is called artificial intelligence (AI). AI can be very helpful. It has the power of improving communication, accelerating discovery and enhancing education. But it can also cause some problems if we are not aware of its potential negative effects.

There are four things that scientists worry about when using AI:

- The data that AI uses might be biased and not fair to everyone;
- People might start relying too much on AI and forget to think for themselves;
- AI might make mistakes when it tries to understand data;
- Using AI might be unfair to some people and raises ethical concerns.

Bias in the training data

When AI uses data that is not fair or inaccurate, the responses to scientist questions will be biased or inaccurate as well. This can cause problems and have a negative impact on new discoveries.

For example, AI might not be able to recognize some people's faces if the training data for facial recognition technology was only limited to images of white individuals. This can have serious consequences because it might cause the wrongful arrest of certain populations (1).

Maria Patron, a personal account

Maria Patron is a scientist with a degree in Biotechnology, a PhD in Neurobiology and a postdoctoral training in intracellular calcium homeostasis. Maria became interested in the use of AI in Academia after completing a course offered by the Max Planck society. She has been sharing her knowledge since then on how to effectively utilize AI to benefit scientists.



Rely too much on AI

Another concern is that scientists might start to think that AI knows everything and can replace human researchers. While AI can assist researchers in understanding large amounts of data, it cannot replace creativity, intuition, and critical thinking skills that are essential in scientific research. Relying too much on AI can lead to a lack of diversity in research perspectives and limit our own scientific discoveries.

For example, AI algorithms can analyze vast amounts of chemical data to identify potential drug candidates, but only human intuition and creativity can look at other important factors, like unforeseen side effects that cannot be predicted by the algorithm (2).

Misinterpretation of data

Sometimes AI might make a mistake when it tries to understand scientific data. This is

because AI is not as smart as people are. It may not understand the context and nuances of scientific language, leading to inaccurate responses. AI might not be able to understand the difference between two things that look very similar but are actually different. This can cause a problem if scientists use AI to make important decisions based on wrong information.

For example, AI algorithms are used to analyze large amounts of genetic data to identify patterns and associations that may be difficult for humans to detect. However, these algorithms may not take into consideration the biological function of the gene, making it difficult to determine whether the genetic variant is actually causally related to the disease or whether it is simply a bystander. This can lead to potentially harmful interventions (3).



An abstract oil paint of a female scientist from behind looking at a computer screen with caution signs. Image generated with DALL-E

Ethical concerns

Using AI in research raises ethical concerns around data privacy, data security, transparency and ownership. AI algorithms require large amounts of data to function, and it is important to ensure that the information that scientists use is obtained ethically and with the proper consent of the individuals involved. Additionally, the use of AI in research may lead to the commodification of data, where individuals' personal information is bought and sold without their knowledge or consent.


As a practical example, a researcher may collect personal data from individuals without their informed consent, or they may use data that has been obtained unethically, such as through hacking or unauthorized access. This can result in harm to individuals, such as identity theft or financial fraud (4).

It is important for us as scientists to approach the use of AI with caution and thoughtfulness. While AI can certainly enhance our research, we must ensure that it is not used to replace human researchers or perpetuate bias and discrimination. We must also be mindful of the ethical implications of using AI in research and take steps to protect the privacy and ownership of data.

To mitigate the potential negative impact of AI on scientific research, we suggest the following:

- Ensure that the data used to train AI algorithms is diverse, unbiased, and obtained ethically;
- Use AI as a tool to complement human researchers, rather than as a replacement;
- Implement regular bias checks on AI algorithms to ensure they are not perpetuating bias;
- Validate the results obtained through AI analysis using independent methods;
- Establish clear guidelines and protocols for the ethical use of AI in research, including data privacy and ownership.


In conclusion, while AI has the potential to enhance our scientific research, we must proceed with caution and consider its potential negative impact. By being mindful of these concerns and taking steps to mitigate them, we can ensure that AI is used in a responsible and ethical manner that benefits scientific research and society as a whole.

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Special Issue

LLMs in healthcare: Where do we stand?

I prompted ChatGPT to write an introduction about Large Language Models (LLMs) usage in medicine specifying it needed to be short and to sound like Nature Communications articles - the prompt: "Write a short introduction about LLMs usage in medicine in the style of a Nature Communication article." The result is in the paragraph below.

Recent advances in artificial intelligence have led to the development of language models capable of processing vast amounts of medical data and generating accurate predictions and recommendations. These language models, known as large language models (LLMs), have the potential to revolutionize the field of medicine by improving diagnostic accuracy, enabling personalized treatment recommendations, and increasing access to medical expertise. However, their use in medicine is not without challenges, as there are concerns about potential biases, lack of transparency, and the risk of spreading misinformation.

During April, I tested ChatGPT on some basic information. The results vary from funny and fake, to potentially useful. The first step was to establish the topic, test the chatbot with some basic terms and try to get some references. The other steps were more focused on refining the results.

I wanted ChatGPT to focus on LLMs in healthcare, specifically on diagnosis, self-diagnosis, and medications. During my MSCA PhD fellowship, I worked with cancer patients, and I know how difficult it is for them to

Ornela Bardhi, a personal account

Ornela Bardhi is a senior researcher and data scientist at Success Clinic, specializing in Real World Data from Nordic countries. Previously, Ornela worked as a scientific advisor to Albania's Minister of Health and Social Protection. She has a PhD in applied machine learning to medical data and is a founding member and the current Chairwoman of the board of the MCAA Western Balkans Chapter. She is passionate about science, technology, and innovation applied to the betterment of patient care, and the environment.



receive the news of a cancer diagnosis. Most of the patients and their family and friends check the “doctor <insert search engine here>” about their disease and rely a lot on it, sometimes even more than their doctors. For this reason, it is imperative to discuss what such tools can and cannot do and how much we should trust them.

When I asked ChatGPT to write a short paragraph on how people have been using the internet and search engines to self-diagnose, it responded by writing that “LLMs have now substituted search engines and websites like WebMD, offering a more conversational symptom analysis. LLM-based self-diagnosis tools are now in use and have allowed people to quickly and easily identify potential medical issues, especially for those without access to medical professionals or who may be hesitant to seek medical advice.” It continued to mention that not everything is all roses, “there are concerns about accuracy and the risk of generating false positives or negatives,” and “despite these concerns, LLM-based self-diagnosis is likely to continue to grow in popularity, requiring improvements in accuracy and transparency, as well as educating the public on their limitations.”

According to ChatGPT, several companies have platforms and applications for self-diagnosis listing increased access to medical information and the potential for early detection of medical conditions as the main benefits. It also lists some risks, such as the potential for false positives (increased unnecessary tests and analysis) and false negatives (leading to delayed diagnosis and treatment), and lack of personalization to individual patients (lack of medical history).

When asked about LLMs usage on drug prescriptions, ChatGPT mentioned two examples, assisting with medication reconciliation in hospitals and developing personalized medication recommendations based on genetic information. It continues to write that LLMs can analyze large datasets of medical records and genetic information to provide accurate and personalized medication recommendations. It cites a study published in the Journal of the American Medical Informatics Association where an LLM-based model predicted a patient's medication regimen with an accuracy of over 90%. I was curious and wanted to learn more about the study, so I asked for the title and authors of the article. To this day, I still cannot find the article because it does not exist.



Such a phenomenon is called “**model hallucination**” (some researchers are opposed to the term and prefer using “**prediction error**”), and it is not something new with LLMs. Since 2022, many scholars and users of any AI-powered chatbot have encountered confident responses not supported by the input data or are otherwise implausible, which can be particularly dangerous in medical settings where decisions can have life-or-death consequences. An LLM-based tool might generate a diagnosis or treatment recommendation that is not supported by the patient's medical history or test results but is instead based on patterns that the LLM has identified in the training data.

I often work with [Anatomical Therapeutic Chemical \(ATC\) codes](#). The codes are easy to find and are publicly available from the World Health Organization (WHO) website. I wanted to test if I could get the information from ChatGPT. I thought this would be straightforward and I would not encounter any mistakes. Well, I was wrong. ChatGPT decided to invent some new compounds and ATC codes or mix the ATC codes of different drugs.


Upon further questioning and probing, ChatGPT mentions some other drawbacks associated with the use of LLMs in medicine, including:

- Bias: LLMs are trained on medical data biased towards a demographic or geographic location, and the responses may not apply to other populations leading to the perpetuation of incorrect medical information or diagnoses;
- Lack of transparency: LLMs are often described as “black boxes” because the process by which they arrive at their predictions is not easily understandable by humans. This lack of transparency can make it difficult for medical professionals to trust and effectively utilize LLM-based tools;

- Ethical concerns: LLMs can raise ethical concerns around patient privacy and data security (data collection, storage, and usage);
- Overreliance on technology: While LLMs can be a valuable tool in medical decision-making, there is a risk that medical professionals may become over-reliant on technology and neglect to consider other important factors, such as patient history and context;
- Cost: The development and implementation of LLM-based tools can be expensive, which may limit their access to certain healthcare systems or patient populations;

Legal and regulatory challenges: As LLM-based tools become more widely used in medicine, there are likely to be legal and regulatory challenges around issues such as liability, safety, and accuracy.

In general, when using ChatGPT or similar LLMs, one must remember that these models are trained on an enormous amount of internet data. Part of that data is factual, fair, and harmless, and the other is misinformed, biased, and harmful material. LLMs are probabilistic algorithms, so if you prompt the same question multiple times, you might get some variations of the same answer or sometimes even a different one. While they are fascinating and, at times, helpful (depending on the use case), the technology has a lot to improve; however, I do not think it will take 50 years to do so.

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Special Issue

Beyond the hype: AI in healthcare - Ethical balance and insights

Examine the ethical dimensions of integrating artificial intelligence into healthcare, as we discuss strategies to balance the potential advantages and challenges that accompany this innovation.

Artificial Intelligence (AI) in healthcare is making big strides in finding illnesses, helping clinicians, customizing treatments, and improving patient care for each patient. This tech can change how patients feel and get better in their life. But putting generative AI in healthcare has ethical problems we need to fix, like keeping data safe, being fair, and safe-guarding human choice and skills in making decisions. Solving these issues is key to making sure AI is good for all patients and keeps trust in healthcare.



Polat Goktas and
Ricardo S. Carbajo,
a personal note

The authors are collaborating on the Artificial Intelligence (AI) project aimed at revolutionizing stem cell manufacturing. Polat is a Marie-Curie Research Fellow, while Ricardo serves as the Director of the Innovation and Development group at the School of Computer Science and Ireland's Centre for Applied Artificial Intelligence (CeADAR), University College Dublin, Ireland. Our strong background in AI research drives our passion for exploring the ethical implications of AI technologies in healthcare and promoting responsible AI implementation. Our current project, DeepStain, focuses on developing advanced AI algorithms to optimize stem cell manufacturing processes, reduce costs, and improve patient access to life-saving therapies. By understanding the ethical challenges and potential benefits of AI integration in healthcare, we hope to contribute to the development of ethical guidelines that ensure patient safety, data protection, and fair treatment for all globally.

As natural language processing tech gets better, generative AI models like the GPT series are emerging as strong tools. OpenAI, partnering with Microsoft, made powerful AI chatbots, like GPT-4, the best one as of March 2023 (OpenAI, 2023). Google Med-PaLM 2 has demonstrated its potential in various medical fields (Google, 2023). In the field of Radiology, AI chatbots have shown promise in helping with image analysis, reducing diagnostic errors, and making workflows more efficient (Shen et al., 2023). In dermatology, AI-powered systems have been effectively used to create medical case reports that are just as good as those written by human experts in clinical practice (Dunn et al., 2023). The use of AI technology in medicine can lead to better diagnosis, increased efficiency, and improved patient care. But there are issues when using this tech in clinics. Using this tech with large language models also brings up some ethical questions, like:

Data privacy and security

AI healthcare systems use lots of patient data to make accurate models. It's crucial to keep this sensitive information private and secure. **Good data protection measures and clear policies on how data is used are needed to maintain patients' trust.** This means using encryption, controlling access to data, and being open about how the data is handled, which helps patients feel more comfortable with AI in healthcare.

Handling algorithm biases

AI systems can sometimes have biases, causing differences in patient care and treatment scenarios. **To prevent this, it's important to create diverse and unique datasets that include various types of patient information.** Additionally, we should regularly assess the AI for any biases, making sure that the applications are fair and unbiased. Taking these steps will help ensure that all patients benefit equally from AI in healthcare, avoiding unfair treatment based on biases in the algorithms.

Beyond the Hype: A scene from an event discussing the promising potential of artificial intelligence in transforming the future landscape of healthcare. The visual was created with Tome.app based on the custom prompt "Beyond the Hype: AI in Healthcare".



Maintaining human judgment and expertise with AI

As generative AI becomes more common in healthcare these days, it's crucial to keep human involvement in patient care. We need to make sure AI supports and enhances clinician expertise, rather than taking its place. **This helps preserve empathy and the personal connection between patients and healthcare providers, ensuring that the quality of care remains high and that patients continue to feel understood and supported in their treatment scenarios.**

Understanding responsibility in AI errors


When AI leads to medical errors, it's hard to determine who's at fault! We need clear legal guidelines that outline the responsibilities of everyone (including user interface interactions) involved, such as AI developers, healthcare providers, and other stakeholders. By doing this, we can protect patients and maintain trust in AI-powered healthcare. Establishing these rules helps ensure accountability and encourages the responsible use of AI technology in medical settings.

Developing ethical and regulatory frameworks for AI

It's important to set up ethical guidelines and regulatory structures for managing AI in healthcare. These frameworks should focus on promoting transparency and ensuring accountability to ethical principles, all while encouraging innovation and technological

progress. **By developing these guidelines, we can find a balance between protecting patients and fostering advancements in AI that can improve healthcare outcomes for everyone.**

In conclusion - **for using AI the right way** - to address the ethical challenges of integrating AI in healthcare, we should have open discussions, implement AI responsibly, and develop technologies that respect human values while improving patient outcomes. By exploring these important ethical concerns, we can gain a better understanding of the potential benefits and risks of AI in healthcare in a responsible way. This understanding will help us create ethical guidelines and best practices for responsible AI implementation, ensuring that we utilize the power of AI to enhance patient care while maintaining the trust and safety of all those involved in the healthcare system.

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Special Issue

Quick adoption of ChatGPT by PhD students: For better?



Photo by Canva.com

ChatGPT has been widely and quickly adopted by PhD students organically without a defined place in the PhD curriculum and research practice. Together with other tools, AI will become a part of the standard toolkit of every PhD student. There is a need for more formal guidelines to ensure that we make the best use of these revolutionary tools.

...and there was ChatGPT.

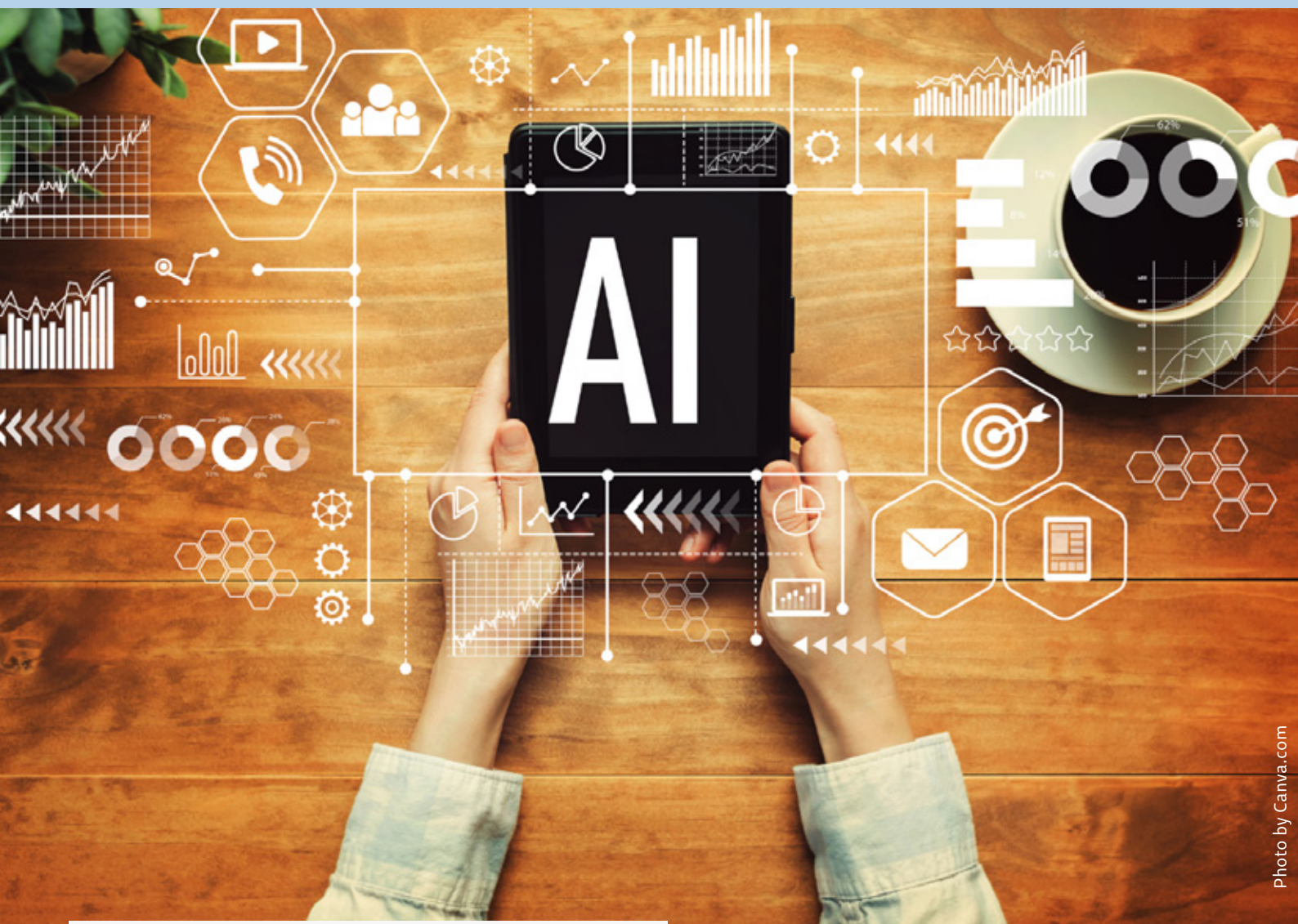
On 30 November 2022, ChatGPT was released to the public. During our weekly catch-up with my team in January, we discussed it for the first time. One of us shared an issue, and a spontaneous answer proposed was "Ask ChatGPT." At this moment, we realized that we all already had an experience with it.

A PhD student needs to answer many questions regarding their direct research topic, and suitable methodology, develop the required skills for a future career, and to evolve in the "jungle" of academia. Some integrate ChatGPT

fizkes, Focused student looking at laptop holding book...

Quentin Loisel, a personal account

Quentin Loisel is a current MSCA PhD fellow at Glasgow Caledonian University. He is part of the [Health CASCADE project](#), aiming to make co-creation trustworthy. Working within an engineering team, their goal is to develop the technologies that will enable evidence-based co-creation. His work bridges technology and the fundamental human dimension within the values of the co-creation process. From cognitive science and approaching multiple fields, the research projects aim to define the needs, organize a taxonomy, develop technological solutions, forecast the impact of future evolutions and develop ethics. With the growing influence of technology, his future objective is to enable collaboration between society's actors to make the best of future technology. He is also in charge of the regional lead for Scotland on behalf of the MCAA UK Chapter.



Melpomenem, AI with a person holding a tablet computer

as the first option to solve these problems. One student used it to replace their momentarily unavailable supervisor, while another got used to it so much that they felt lost if they could not access it.

However, ChatGPT polarized opinions. Some are excited, suggesting it is just the beginning and further improvement will revolutionize our work, making it faster, and easier and opening new research perspectives. Others are more skeptical, since they often hear similar claims of imminent technological revolutions, and they notice the limits: struggling to get innovative outputs, basic mistakes, and unclear data treatment. Nonetheless, there is one agreement in the middle: it allows us to do more.

Already a research tool?

Indeed, beyond excitement and doubt, a strong force pushes students to use this technology: it is helpful. To explore their research question, students must discover and integrate various information. They need to be polyvalent and productive. This is precisely what ChatGPT is: a fast, accessible, efficient polyvalent tool that increases productivity.

Of course, some limits remain, and essential questions must be addressed. However, if future improvements in large language model (LLM) technologies overcome some of these limits, we could expect it to be implemented as a future tool for research practice. At this point,

it could profoundly change our way of studying, researching, and creating knowledge.

Nevertheless, this spontaneous adoption has not been made with a defined place in the PhD curriculum. Indeed, there are potential immediate risk factors: recognition of errors, responsibility in output usage, intellectual property, data leakage, scientific integrity and ethics, etc. Guidelines and training are needed to ensure this technology's best and most appropriate use. For example, learning how to ask the right questions in a dialogue can exponentially increase the quality of the output.

A revolution for the better?

Beyond the usual dichotomy of "[Use/Ban] it or perish!" Let's highlight some practical implications we need to consider with a broad adoption for PhD students.

As suggested, researchers have much to win using efficient and reliable LLM technology. However, the force driving its adoption is based on environmental pressure. Academia is a very competitive environment. Chatbots are likely to raise the production level expected of researchers by minimizing repetitive tasks and improving flexibility, yet they cannot reduce the overall workload. It might even increase it. Instead of "Publish or perish," we might evolve to a "Publish more or perish."

It will allow us to do more with less... but also differently. Indeed, asking a chatbot to do a task for us will likely prevent us from developing the necessary skill to do it ourselves. The question raised is: What skills and knowledge does a PhD student need to acquire to become an accomplished researcher? Answering this question may lead us to still dedicate time and effort to developing a skill while we know that technology can do it better and faster.

Finally, we may legitimately wonder if technology could one day develop knowledge

faster and better than humans and if the researcher won't just become a technician. In this case, it will be necessary to recontextualise the crucial role of the researcher. With a growing part of society losing trust in the scientific method and nourishing fears about artificial intelligence technology, we will need researchers who contextualize and ensure the quality of the knowledge created. To do so, PhD students must develop all the skills and ability to understand these new tools that are becoming more prevalent in their practice.

To conclude


Some PhD students have already adopted ChatGPT, and the reasons are primarily practical in a competitive environment: doing more with less. If the LLM technology overcomes its limits, it will likely be widely adopted and become a must-have. This raises the need to conceptualize the place of this technology alongside the researcher and to create appropriate guidelines for the most efficient and proper use. Thanks to its strong research community, this is a question that the MCAA could address with a forum.


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Special Issue

How language AI can transform project management and boost efficiency and creativity

AI-driven language tools may become valuable assistants in project management routines. The article suggests a number of use cases as well as examples of prompts to try out.

Project management is a challenging task that requires managing international collaborations, handling multiple deadlines, maintaining communication channels, making data-driven decisions, and being adaptable to unexpected situations, such as budget constraints and changes in plans.

If you have been keeping an eye on the tech scene, you have probably seen headlines like, "The Top XX Mind-Blowing Applications of ChatGPT", "215+ Can't-Miss ChatGPT Prompts", or "Top 10 Most Insane Things ChatGPT Has Done." To stay ahead in the game, project managers need to keep themselves updated with the latest technological advancements. Large Language Models (LLMs) like ChatGPT, Bard, and others can be game-changers in this regard. By incorporating these AI tools into their toolkit, project managers can revolutionize their workflow and simplify their tasks. In this article, we will explore some practical examples of how ChatGPT and similar tools can be used to streamline project management tasks.

Jonas Krebs, a personal account

Jonas Krebs currently serves as the scientific project manager and coordinator of the projects area at the "Strategy and Funding" office in the Centre for Genomic Regulation (CRG) located in Barcelona. He obtained his PhD in plant molecular biology in 2010 from the University of Potsdam, Germany, and has since held various roles in project development, research management, internationalization, and professional networking at different institutions. In 2014, he focused on European research funding and earned the certificate of "EU-Liaison officer" from the German Federal Ministry of Education and Research. Since 2015, Jonas has been responsible for developing and managing EU projects at CRG, with a primary emphasis on Marie Skłodowska Curie Actions. He is an active member of the Marie Curie Alumni Association (MCAA) and co-founded and currently chairs its Research Management Working Group.



Image by Midjourney, prompt by Fabrizio Martina

Say Hello to Crystal Clear Communication

Effective communication is at the heart of successful project management. LLMs can be your ally in crafting direct, easy-to-understand messages, emails, and reports. By leveraging their capabilities, we can sidestep lengthy emails, cryptic jargon, and misinterpretation. Plus, they're an excellent tool for brushing up our English language skills, especially for those of us who are not native speakers.

Example prompts:

- "Summarize [text] in exactly xx words"
- "Shorten this email by 30%"
- "Rephrase this text to make it [more casual/first person/humorous]"

Banish Writer's Block Forever

Chances are, you have experienced this all too familiar scenario: you would like to draft an initial piece of text - be it a tweet, a blog post, or a script for a dissemination video. You stare at the blank page, unsure of how or where to begin. But fear not! LLMs are here to banish your block. Just provide a few key points and some

context, and you can get a suggested structure as a starting point. Even if it is not perfect, it's much simpler to revise such a skeleton than to create it from scratch. At least, that has been my experience.

Example prompts:

- "Address this heading/question by incorporating the following points"
- "Turn this text into a tweet/LinkedIn post"
- "Suggest a (video) script/Twitter campaign about ... and highlight...."
- "How can I structure a section about"

Expert Tip: If you find that the output from an LLM doesn't quite match the tone or style you were aiming for, don't worry! There are several ways to address this. For instance, you can copy and paste your own previous text samples that you liked and ask the LLM to analyze the tone and style. Then, use the received attributes as additional instructions for your next prompt. Another option is to use any other text as input to mimic a particular style, such as that of your favorite writer, journalist, or scientist.

Ace Those Difficult Conversations

As a project manager, you're tasked with managing challenging discussions among consortium members or colleagues. Addressing performance problems, disputes over intellectual property rights, or budgetary concerns can be awkward and tough to handle. With only a few clicks, your AI-powered LLMs can quickly provide a personalized blueprint of what to say, role-play the conversation, and even identify potential compliance issues.

Example prompts:

- "How can I address a consortium member who constantly misses deadlines without causing resentment?"
- "Help me script a conversation where I have to inform the project officer about a delay in our project delivery"
- "How can I approach a conversation with upper management about the need for more resources for our project?"

Unleash Your Creativity

ChatGPT can be a great asset to project managers when it comes to brainstorming

tasks. By providing alternative perspectives and fresh ideas, LLMs can help project managers to overcome unexpected challenges and roadblocks. LLMs can also suggest new activities and approaches based on data and past experiences, giving project managers access to a wider range of potential solutions

Example prompts:

- "How can I actively involve our Early Stage Researchers in..."
- "How can I structure an interactive 2-day workshop on..."
- "How can our project... promote its achievements to the public in a comprehensive and engaging manner?"

Excel in Excel

As a project manager, I frequently find myself reaching the limits of my Excel skills, whether it's creating budget forecasts, sorting survey data, or other tasks. This is where LLMs can be a game-changer. LLMs are capable of understanding natural language queries and can provide appropriate Excel formulas in response. By simply asking the LLM for the formula needed to accomplish a specific task,



Image by Midjourney, prompt by Fabrizio Martina

the model can quickly provide the correct formula or function, saving time and reducing the likelihood of errors.

Example prompts:

- "How can I extract from column A... and show in column B only..."
- "Which formula allows me to compare/ identify/ forecast..."
- "Suggest tips for using Excel's conditional formatting to better manage and monitor project expenses."

Integration of LLMs into other Apps

LLM-powered chatbots are already incredibly powerful, but in this last point, I want to showcase two examples that take LLM integration to the next level. These apps combine LLMs with audio and virtual reality (VR) technology, demonstrating the full potential of these tools.

Read AI:

- Read AI is a dashboard for virtual meetings that leverages AI and LLMs to document the meeting and measure engagement, performance, and sentiment among participants."
- it creates a full transcript of your virtual meeting, but also key questions that were discussed, a summary with action points, and an engagement report of attendees.

We had a first pilot test of the tool in our working group coordination team, and such Apps have a high potential to safeguard you from the annoying task of writing the minutes and/or summary reports.

VirtualSpeech:

- VirtualSpeech is an AI-powered training tool for improving communication skills.
- In short: you can put on your VR headset and can practice conversation with ChatGPT-enhanced avatars, amongst other functionalities.

I discovered the tool in my role as the project manager of the ITN PROTrEIN and currently explore how we can use it on the consortium level. We meet already for more than a year with all ESRs in virtual reality-assisted tools and platforms.

Conclusion

I hope this article provided you with some fresh ideas on how AI-driven LLM tools can assist project managers. ChatGPT provided helpful advice in writing this article. In our Research Management Working Group, we had so far, no systematic exchange on the experiences and potential of LLMs in our daily work. But it is definitely about time to facilitate such a discussion. We have established a great platform for it.

It is important to acknowledge that the constant influx of new tools and advancements in LLM models and algorithms also raises ethical concerns, which are addressed by other articles in this newsletter. I very interestedly follow the debate on "intellectual input" vs. pure "content creation". In a research funding system that is mostly based on grant writing, I sincerely wonder whether LLM-generated proposals become the norm, and if so, how this will impact the current model of funding allocation. The rapid development of LLMs highlights the need to re-evaluate existing research funding models and assess if they're still appropriate. Might we soon see a competition between AI text generation and detection tools that aim at identifying syntactically generated text?

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Partner

Cyber Valley researchers link AI and society

Baden-Württemberg in Germany is home to Cyber Valley, where development of artificial intelligence (AI) reaches across society.

AI is only as good as the algorithms that feed it. As a result, the technology can be biased, depending on how it has been trained. In certain circumstances this bias can have drastic results.

"A biased AI controlling an automatic door might open for white men, but not for black women," explains Samira Samadi, leader of the Fairness in Machine Learning group at the Max Planck Institute for Intelligent Systems in Tübingen. "Errors like these have an effect on people's lives."

Samadi's institute is part of Cyber Valley in Baden-Württemberg, in the south-west of Germany, an area that has become a beacon for AI research and development. And one of the big aims for Samadi, and others like her, is to make AI more equitable by eliminating the sources of bias so that the algorithms can work for everyone.

Collaboration and partnership across the valley

Nestled in the mountains bordering France and Switzerland, Cyber Valley was founded

in 2016 by partners from government, science and industry (see 'Partnering for AI research'). Just five years later, the region already contributes more research to machine learning and computer vision conferences than anywhere else in Europe.

"There are lots of people conducting good research in Cyber Valley," says Wieland Brendel, AI group leader in the department of neurology, University of Tübingen. "There is also a growing community of start-ups, so there is research outside academia," he adds, who is also co-founder of one such start-up called Layer7 AI.

Such close ties between science and business have helped propel Baden-Württemberg to the top of the EC's European innovation scoreboard for 2021.

But, Brendel explains, AI isn't just a matter for those who create the technology, it also connects with society. Researchers should consider the effect of technology on a wider scale. In March 2021, Cyber Valley launched 'AI and Society: Exploring Possible Futures', a public engagement initiative to make AI more accessible by giving members of the public the chance to meet AI researchers.

This initiative complements Cyber Valley's Public Advisory Board, which reviews the ethical and social implications of projects funded by the Cyber Valley Research fund. "We have a responsibility to be outside our research bubble," says Brendel.

Building a future in Baden-Württemberg

As well as connecting research, Baden-Württemberg also connects people as it welcomes scientists from all over the world. Samadi was born in Iran, and moved to Tübingen in September 2020, following her PhD at Georgia Tech in the United States. Here she has found a new home.

"Tübingen is a good place to be a young computer scientist. It's growing fast, and the funding is there for AI," says Samadi. "It is one of the best places to be for research." Baden-Württemberg invests heavily to maintain this position. In 2017, it contributed 5.6% of GDP to research and development, the highest of all 78 regions in the EU.

But there is more to Cyber Valley than just its professional appeal. "The community is welcoming and friendly," adds Brendel. "It's a good place to have a balance of family life, research and entrepreneurship."

Partnering for AI research

Cyber Valley is Europe's largest research consortium in the field of artificial intelligence.

Founding partners include:

- The state of Baden-Württemberg
- The Max Planck Society with the Max Planck Institute for Intelligent Systems
- The Universities of Stuttgart and Tübingen

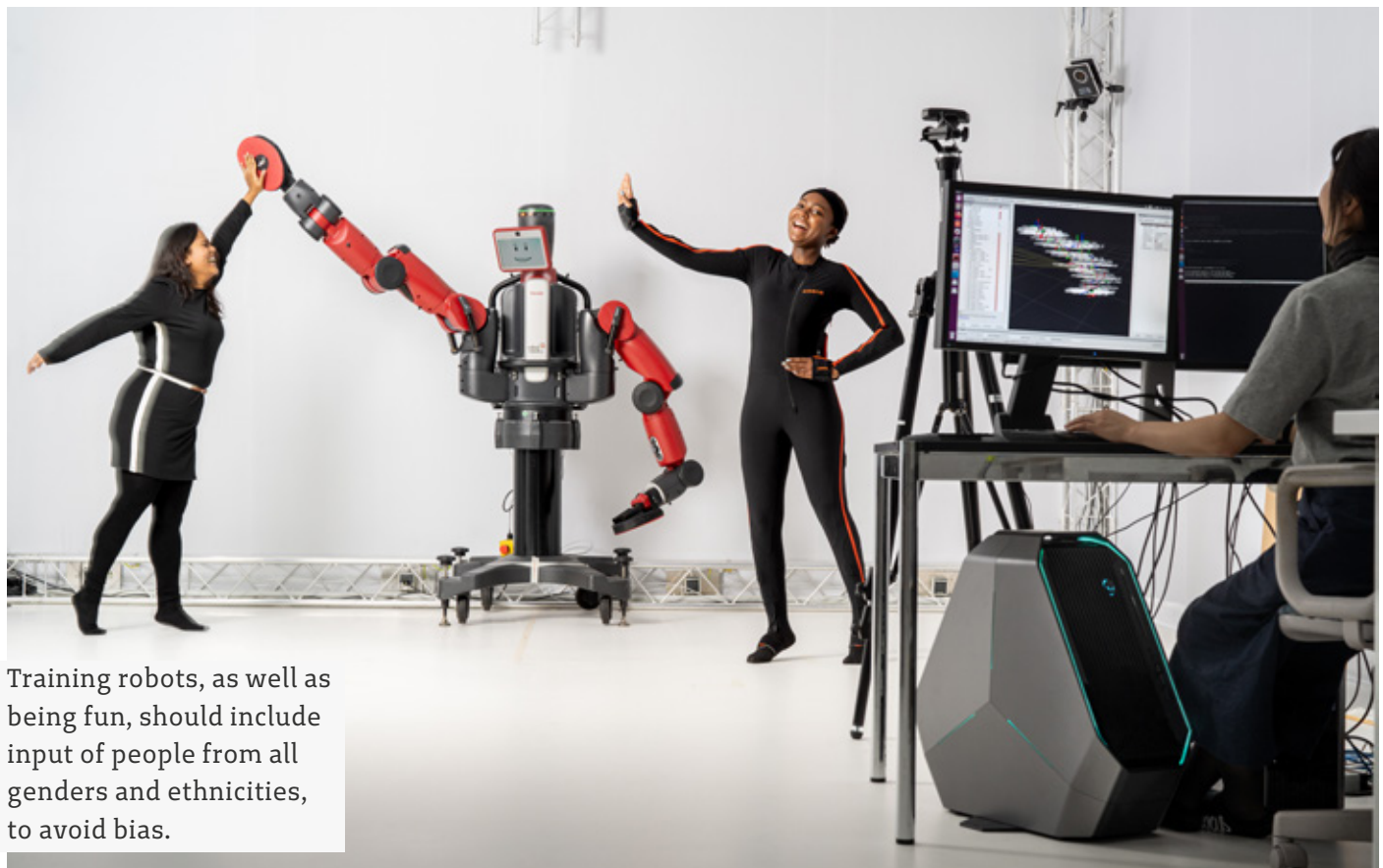
- Amazon
- BMW AG
- Mercedes-Benz Group AG
- IAV GmbH
- Dr. Ing. h.c. F. Porsche AG
- Robert Bosch GmbH
- ZF Friedrichshafen AG

Fraunhofer-Gesellschaft has since joined as a partner. Cyber Valley also receives support from the Christian Bürkert Foundation, the Gips-Schüle Foundation, the Vector Foundation, and the Carl Zeiss Foundation.

To learn more about opportunities in Baden-Württemberg for international researchers, please visit <https://www.bw-career.de/en/>.

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Training robots, as well as being fun, should include input of people from all genders and ethnicities, to avoid bias.

Photo by Leonie Roerich

Accessibility Statement

The MCAA believes in a society based on diversity. A society where diversity is the norm, not a deviation. A society where diversity is a strength, not a weakness. Access barriers are created by a society that does not acknowledge the value of diversity. Diversity and access are foundational elements of the flourishing of the research endeavour.

As a community of researchers, the MCAA is committed to increase the accessibility of its products, services, and events. Under the leadership of the Editorial Team of the Communication Working Group, with the support of other Working Groups and the MCAA Board, the MCAA has been promoting a series of actions aimed at increasing the inclusivity of its community and reducing access barriers.

Since the June 2021 issue, the MCAA Newsletter has a new layout. The new design should make the reading experience more accessible by reducing a number of barriers our readers may face.

The new layout complies with many requirements of major print and digital accessibility standards and guidelines. For example, background and foreground colours were selected and paired so as to fulfil the AAA level requirements for colour contrast devised by the Web Content Accessibility Guidelines (WCAG 2.1). Colour selection and pairing also complies with requirements for colour blindness. The text is not justified in order to keep the spacing between words consistent and regular in the entire text. Line spacing and font size were revised and increased too. Each macro-section is identified by a different colour so as to provide the reader with a map of content organisation. The layout adopts TestMe, a font inspired by the Design for All principles. Last but not least, the PDF file now complies with PDF accessibility requirements and can be used by screen readers.



Editorial information



About

The MCAA Newsletter is the main communication channel for and about the MCAA community. It is a publication venue for science communication and public outreach. Its main aim is the dissemination of information about past and current MSCA projects, as well as activities of MCAA Chapters and Working Groups, events, and members' achievements.

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Instructions for submission

Authors interested in submitting an article should read the Editorial Guidelines and the Editorial Rules available on the [s](#). Articles should be submitted **exclusively** through the form available on the MCAA Newsletter website.

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The TestMe font was designed by Luciano Perondi and Leonardo Romei and it is distributed under Open Font License. More information is available at the font's [official website](#).