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## AI's Ethical Frontier

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# AI'S ETHICAL FRONTIER

Artificial intelligence is affecting every aspect of the university and society. DePaul experts weigh in on its impact.

By Eve Becker

When engineers build a bridge, they conduct feasibility studies about how it will affect the local community and environment. But when a big tech platform is built, such as Facebook or ChatGPT, there's no societal assessment, even though the impact is global.

"We need to do better," says Ljubomir Perkovic, director of the School of Computing in DePaul University's Jarvis College of Computing and Digital Media. "We create these artifacts. We throw them on society. They have a huge impact. And then we just say, 'Deal.'"

## ► Designing DePaul

The rapid adoption of generative artificial intelligence (AI) technologies such as ChatGPT has opened a range of possibilities and risks. AI can craft essays, produce marketing campaigns, write code and create art. It can also replace human writing, eliminate jobs, promote bias and hallucinate false information.

DePaul, with its strong computing program and emphasis on Vincentian

personalism, is well positioned to become a leader in AI conversations.

The university is developing an Artificial Intelligence Institute that will play a pivotal role in advancing artificial intelligence research and applications.

The new institute is part of an interdisciplinary, data-rich ecosystem taking shape at DePaul where AI research thrives, internal and external stakeholders convene and evidence-based solutions emerge. Faculty members and staff will actively participate in advancing research and contributing to meaningful societal change.

## ► AI revolution

Experts across society need to address the effects of AI, says Bamshad Mobasher, chair of the Artificial Intelligence Program in DePaul's School of Computing.

"I don't think it's an exaggeration when people talk about an AI revolution. Artificial intelligence is transforming the world as we know it," says Mobasher, who is leading the AI institute initiative. "It comes with a

lot of potential for good as well as peril. This moment requires a broad conversation about this technology and its implications. And it needs to happen at every level."

The primary goal of the institute is to promote interdisciplinary research and educational programs centered around the promises and challenges presented by AI. "The AI institute will capitalize on the research and creative activities of DePaul faculty from many colleges and programs and collaborate with industry and academic partners outside DePaul," Mobasher says.

DePaul, with its expert faculty across many disciplines and partnerships with Chicago-area organizations and policy-makers, is primed to be a center for those conversations.

"Given DePaul's mission of always trying to do good and pursue social justice, it's almost like it's our duty to examine the role that computing has on society, address the negatives and try to fix those," Perkovic says. "I strongly believe that each one of us can impact the world, and we can change it."

# AI ROUNDTABLE

We asked experts from across DePaul to share their insights on AI's advantages and pitfalls. Here are their answers.

**How will artificial intelligence (AI) change business?**



**James Mourey, associate professor of marketing and executive director of the BETA Hub, Driehaus College of Business:** Some of the upsides of AI in business are straightforward: lower costs, faster performance, greater consistency. However, some of the downsides include worker displacement, technological errors, implicit bias and discrimination.

It becomes incumbent on us – as a society, as businesses, as engineers – to update algorithms to be inclusive and to avoid harm. We need to be more proactive when it comes to educating, upskilling and helping folks transition from jobs that are likely to be impacted by technological advances.

As Spider-Man says, “With great power comes great responsibility.” It really is that simple: Technological innovation can create incredible value, but we must be mindful of how to create that value in a way that doesn’t hurt others.

**How could AI affect scientific research?**



**Eric Landahl (CSH MS '96), professor of physics and astrophysics, College of Science and Health:** As an experimental physicist, I view AI as a precision instrument to enhance our understanding from what we already have. AI fine-tunes our experiments before we engage costly apparatus, improving predicted outcomes. AI can extract valuable information

from sprawling and complex data sets. It streamlines the routine tasks of mathematical derivations and equation visualizations. In the laboratory, AI helps me design new apparatus and automate data collection.

I have two major concerns in harnessing AI for scientific research, as the technology exists today. First, citing prior work is essential for establishing reproducibility and fostering scientific careers, but most AI applications don’t cite sources, or they can hallucinate sources. Second, there are privacy concerns, especially if proprietary, sensitive or protected types of research become part of the AI training data.

**How can marketing and advertising use AI?**



**Tao (Tony) Deng, assistant professor of public relations and advertising, College of Communication:** AI tools like GPT-4 can generate engaging and relevant content for marketing campaigns, such as email marketing copy, digital ads, blog posts, articles, social media content and videos. For email marketing, AI personalizes content by using machine learning to analyze customer behavior.

In digital advertising, dynamic creative optimization tools use existing brand assets to create and serve digital ads in real time, adjusting to users’ characteristics and past behaviors. By analyzing consumer data, AI tools can predict future behavior and trends, enabling marketers to foresee customer needs and modify their strategies in advance.



## What are some legal issues involved with AI?



**Joshua Sarnoff, professor of law, College of Law:** There are any number of issues. First is the increasing ability to do very effective deepfakes. Who's liable for posting fake information? Is it the company that provided the AI training? Will a company that republishes the fake information be held liable? What about the company that intentionally generates it?

In the medical field, AI can be used to help detect certain types of cancers or medical problems. Obviously, that's incredibly valuable, but who is going to be liable if it makes a mistake?

On the intellectual property side, there's the issue of patents and copyrights. If you tell AI to copy the style of an artist, is it actually copying from the artist or is it learning and generating something new? What if the AI system is being deployed to generate an output that ultimately will be commercializable? When is the AI contribution to an invention sufficient to be treated as joint inventorship?

## How does the growth of AI affect library science?

**John Leeker, associate university librarian for Collections and Discovery Services, DePaul University Library:** From optical character recognition, which uses machine learning to read typed and handwritten digitized documents, to the integrated library system that contains our catalog, AI is already improving the functionality and discoverability of many library resources.

However, AI is not without problems and risks. AI is only as good as the data used to train it. If the data used to train it does not reflect a diverse and varied data set, it ends up reproducing and even amplifying structural inequalities. In addition, AI is often trained using copyrighted material without the permission of the creators and rights holders.



## How can computer scientists address bias in algorithms?



**Bamshad Mobasher, director of the Center for Web Intelligence, Jarvis College of Computing and Digital Media:** The main focus of my research is personalized recommender systems – the kind of systems you see on Amazon, Netflix and YouTube that learn from users' past activities and personalize content for them. We have helped develop many of the recommendation algorithms in use today.

These systems increase user engagement and help users deal with information overload. But they also have potentially negative implications, like amplifying existing bias in the training data or creating a rabbit hole effect when users get drawn into "filter bubbles," isolated from content because of algorithms selectively feeding them news.

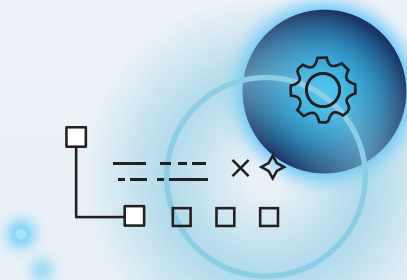
You don't want a job recommender system that only gives recommendations for CEO positions to men and secretary positions to women because it's trained on data from the past. We're trying to identify the bias that's creeping in, develop algorithms that mitigate the bias and deal with issues of fairness and balance in the output of these systems.

## How will tools like ChatGPT affect the way that educators teach?

**An-Chih Cheng, associate professor, teacher education, College of Education:**

Instead of fighting or banning ChatGPT, teachers can embrace it by using it to work together with students to facilitate richer and guided learning. This can be done by transforming traditional tasks such as an end-of-term essay into a more interactive, ongoing dialogical process. This creates a learning environment where students are not merely receivers of information but active participants.

Teachers can also use AI tools to engage with students to understand their thought process, develop ideas together and enhance personalized learning that caters to individual needs and styles. This can be done by designing assignments that require students to think creatively and critically. Assignments like these make it harder to use AI, as personalized and reflective assignments are harder to plagiarize.





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– John Leeker,  
Associate  
University  
Librarian

**What are some issues involved with AI and screenwriting?**



**Brad Riddell, associate professor, School of Cinematic Arts, Jarvis College of Computing and Digital Media:**

Producers can quickly generate a story concept using AI, then pass that content off as original material, saving themselves from paying a writer for story development steps. While I find that to be unfair, using AI is far more insidious.

Generative AI sources content that already exists, looking for patterns and information to solve the prompt it was given. So, if you ask it to fabricate a story

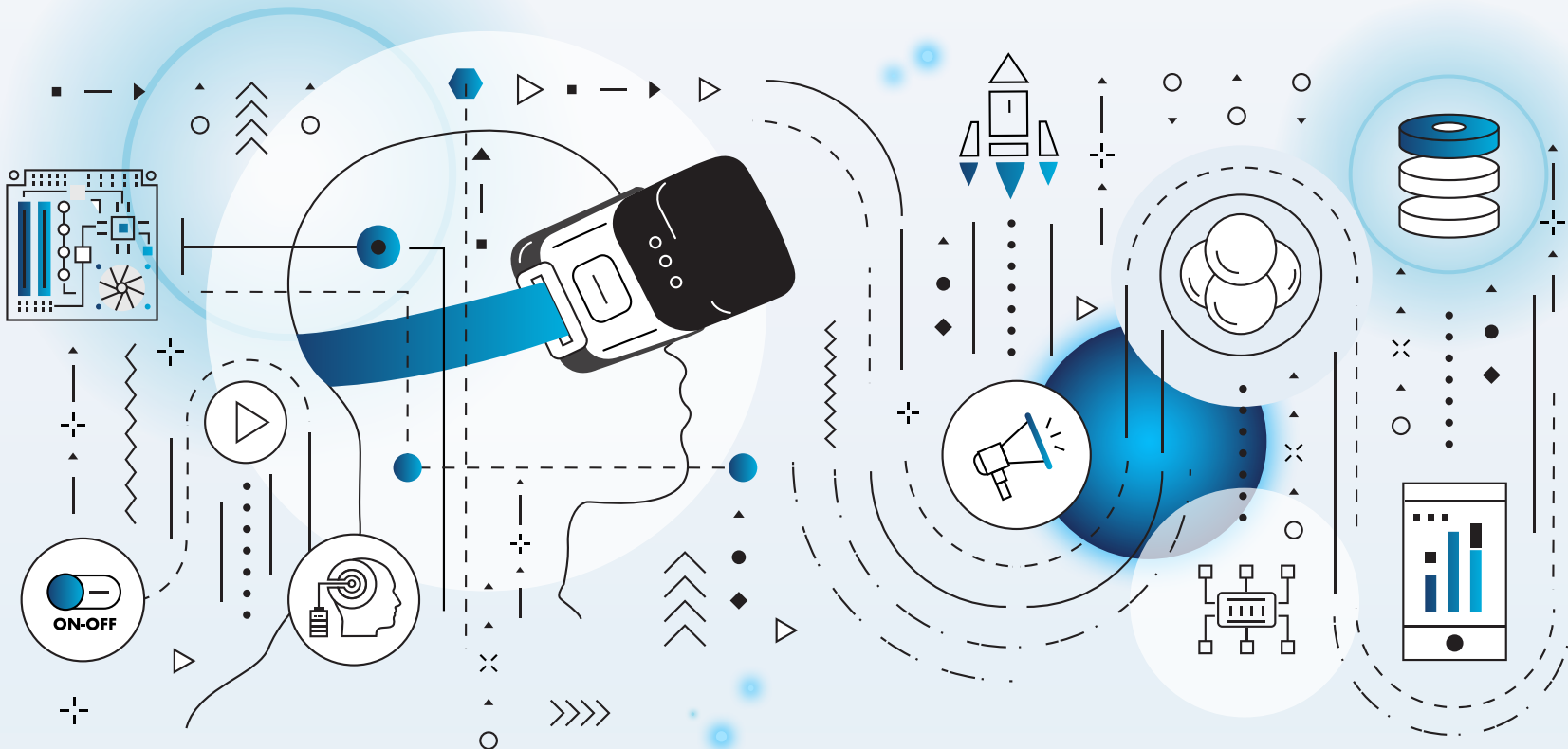
concept about a soccer team on Mars, it's going to pull from everything that already exists – sports stories and Mars narratives – and give you an amalgam of what it finds. So, in essence, each story it creates is borrowed. If we think Hollywood is unoriginal now, wait until we hand over the content creation to machines!

**What are some concerns about students using AI in the classroom?**

**Erin Workman, associate professor and director of first-year writing, College of Liberal Arts and Social Sciences:** It's imperative that we develop critical AI literacy. Instructors must be clear about expectations, guidelines and prohibitions regarding AI use in their courses: What uses are permitted or prohibited and why? How should AI use be documented or cited? Learners must be transparent and honest about their use

of AI. And we must trust and respect learners in our classrooms.

While AI writing tools can be valuable to provide inspiration or generate ideas, it's crucial to ensure that our own voices, creativity and innovation are not surrendered to AI. There are productive uses of these tools, but they are not a replacement for our own individual and collective thinking, writing and meaning-making processes.



# KEEPING IT REAL

DePaul is harnessing the power of artificial intelligence. Here are three projects that are using AI for good.

## ► Movement disorders

**Eric Landahl (CSH MS '96)**, professor of physics and astrophysics in DePaul University's College of Science and Health, first started working with artificial intelligence (AI) 10 years ago. As an experimental physicist, he was studying protein folding in cells. When faced with a complicated data set, Landahl designed a machine-learning algorithm to help characterize the data.

In January 2023, Landahl embarked on a project with Rosalind Franklin University to characterize the movements of mice with neurological disorders. The Rosalind Franklin researchers induce symptoms typical of Parkinson's disease in mice, give them drugs and observe movements to see whether the drugs help or have side effects.

Landahl employs machine learning to look for patterns in noisy, or variable, data. The aim is to develop a model that can classify Parkinson's symptoms, understand drugs' side effects and identify movement disorders early, using AI to identify elements that humans may miss.

"We like patterns. But if the pattern is the pattern of noise, like the random movements of mice, it's hard for us," Landahl says. "AI algorithms may be better at understanding noise characteristics than humans."

## ► Handwritten text recognition

With support from the Vincentian Endowment Fund and the Vincentian Studies Institute, DePaul University Library Special Collections and Archives is digitizing handwritten ledgers kept by Vincentians in Missouri in the 1800s.

The ledgers document the order's daily operations. Some entries illuminate how the labor of enslaved persons contributed to the foundation and growth of the order in its early years in the U.S., says Jamie Nelson, head of Special Collections and Archives.

DePaul is using AI in the Quartex software platform to process scanned images of handwriting and produce transcripts that can be searched, indexed and read in a familiar font. Handwritten text recognition (HTR) asks AI to learn from a set of examples and evolve as it applies pattern-matching to individual handwriting styles.

"AI is making these ledgers intellectually and visibly accessible," Nelson says. "Rather than having to come to the reading room in the Richardson Library and browse through pages of handwriting looking for a specific term or ledger entry, the HTR-generated transcripts facilitate searches that take researchers to a specific page, from the convenience of their device's screen."

## ► Medical analytics

"Our underlying motivation is, how can we use computer science to help sick people?" says Jacob Furst, professor of computing in DePaul's Jarvis College of Computing and Digital Media.

Furst co-leads the college's Medical Informatics lab, where he is involved in several research projects that use AI and biomedical data.



Handwritten text recognition makes historical Vincentian ledgers more accessible.

Furst is working with DePaul students to develop an AI algorithm to help doctors diagnose lung cancer. He's working with a curated dataset in which radiologists have rated the malignancy of lung nodules seen on CT scans. The algorithm learns from that data to classify other images, finding patterns that humans might not identify.

Furst and students are also collaborating with psychology professor Leonard Jason to characterize long-haul COVID-19 symptoms and with neuroscience professor Dorothy Kozlowski and social work associate professor Sonya Crabtree-Nelson to examine text data about traumatic brain injury and intimate partner violence.

"We can use AI to help sort through the data and make lives better for patients," Furst says. "That, for me, is a strong motivator."



Jacob Furst and graduate research assistants Charmi Patel (left) and Amal Almansour apply AI in projects designed to improve health outcomes.