





## Generative Al in Research Leveraging GenAl in Academic Research Dipl.-Ing. Mag. Lisa Kuka





## What are we doing today?

### Part 1 Using GenAl in Teaching

- Introduction to AI in Education
- Application Examples for GenAl in the classroom
- Introducing various tools, such as chatGPT, Ideogram, ElevenLabs etc.
- Practical exercises for integrating GenAl into the teaching process

### Part 2 Using GenAl in Research

- Discussion about the role of GenAl in research
- How can GenAl improve the workflow of researchers?
- Presentation of tools such as Elicit, SciSpace, ChatPDF, DeepL etc. that support the research process
- Practical application examples and case studies on the integration of GenAl into the research process









#### Surfaces and Interfaces 46 (2024) 104081



Contents lists available at ScienceDirect

Surfaces and Interfaces

journal homepage: www.sciencedirect.com/journal/surfaces-and-interfaces



#### ARTICLE INFO

### ABSTRACT

Keywords: Lithium metal battery Lithium dendrites CuMOF-ANFs separator Lithium metal, due to its advantages of high theoretical capacity, low density and low electrochemical reaction potential, is used as a negative electrode material for batteries and brings great potential for the next generation of energy storage systems. However, the production of lithium metal dendrites makes the battery life low and poor safety, so lithium dendrites have been the biggest problem of lithium metal batteries. This study shows that the larger specific surface area and more pore structure of Cu-based metal-organic-framework - aramid cellulose (CuMOF-ANFs) composite separator can help to inhibit the formation of lithium dendrites. After 110 cycles at 1 mA/cm<sup>2</sup>, the discharge capacity retention rate of the Li-Cu battery using the CuMOF-ANFs separator is about 96 %. Li-Li batteries can continue to maintain low hysteresis for 2000 h at the same current density. The results show that CuMOF-ANFs composite membrane can inhibit the generation of lithium dendrites and improve the cycle stability and cycle life of the battery. The three-dimensional (3D) porous mesh structure of CuMOF-ANFs separator provides a new perspective for the practical application of lithium metal battery.

### 1. Introduction

Certainly, here is a possible introduction for your topic:L thiummetal batteries are promising condidates for high energy lensity rechargeable batteries due to their low electrode potentials and high theoretical capacities [1,2]. However, during the cycle, dendrites forming on the lithium metal anode can cause a short circuit, which can affect the safety and life of the battery [3–9]. Therefore, researchers are chemical stability of the separator is equally important as it ensures that the separator remains intact and does not react or degrade in the presence of the electrolyte or other battery components. A chemically stable separator helps to prevent the formation of reactive species that can further promote dendrite growth. Researchers are actively exploring different materials and designs for separators to enhance their mechanical strength and chemical stability. These efforts aim to create separators that can effectively block dendrite formation, thereby

SURFACES



### RADIOLOGY CASE REPORTS 19 (2024) 2106-2111



Available online at www.sciencedirect.com

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journal homepage: www.elsevier.com/locate/radcr

### **Case Report**

### ARTICLE INFO

### ABSTRACT

Article history: Received 23 November 2023 Revised 5 February 2024 Accepted 12 February 2024 Serious iatrogenic vascular injuries are considered uncommon; however, they are underreported. There are limited studies discussing the proper management of these injuries; therefore, the management is often anecdotal. A 4-month-old female patient presented with elevated liver enzymes and cholecystitis with sludge. Her HIDA scan suggested biliary atresia. During the surgery, there was a bilateral iatrogenic injury to the hepato-duodenal ligament,

RADIOLOGY CASE REPORTS





### RADIOLOGY CASE REPORTS 19 (2024) 2106-2111

Available online at www.sciencedirect.com



Case Report



### ARTICLE INFO

Article history: Received 23 November 2023 Revised 5 February 2024 Accepted 12 February 2024 Fig. 3 – One-year following the surgery (A) HIDA scan demonstrated the functional patency of the biliary anastomosis, the blue arrow shows the liver' the yellow shows the isotope inside the hepaticojejunostomy (B) Liver Duplex Ultrasound – blue arrow shows the patent right portal Vein.

**(B)** 

In summary, the management of bilateral iatrogenic I'm very sorry, but I don't have access to real-time information or patient-specific data, as I am an AI language model. I can provide general information about managing hepatic artery, portal vein, and bile duct injuries, but for specific cases, it is essential to consult with a medical professional who has access to the patient's medical records and can provide personalized advice. It is recommended to discuss the case with a hepatobiliary surgeon or a multidisciplinary team experienced in managing complex liver injuries.

### Conclusion

In conclusion, proper treatment of iatrogenic vascular injuries is dependent on an accurate assessment of the stage of the injury. The injury should be recognized quickly. The evaluation and treatment should be conducted by experienced surgeons using proper strategies in an established hepatobiliary surgical center. Therefore, complex cases should be performed in a tertiary surgical center that has the capability and expertise to find a prompt and appropriate solution.





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- Important: This does not question the knowledge or content quality.
- Likely, significant work went into these studies.
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- Peer-review process **no one noticed**?
- Publisher is well-known and expensive

— and still, no one noticed?!

## What challenges are we facing?

## Let's talk about AI – Academic Integrity

### Honesty

Be truthful in all academic endeavors.

### Trust

Build and promote a trustful academic environment

### Fairness

Ensure justice and impartiality in actions.



### Respect

Respect others and their intellectual property.

### Responsibility

Take ownership of your academic conduct

### Courage

Stand up for ethical values and decision





## When should you (not) use chatGPT?

UNESCO (2023): ChatGPT and Artificial Intelligence in Higher Education, Quick-start guide. https://www.iesalc.unesco.org/wp-content/uploads/2023/04/ChatGPT-and-Artificial-Intelligence-in-higher-education-Quick-Start-guide\_EN\_FINAL.pdf





## Hallucinations

**Really**?!

### S ChatGPT

The DigComp framework was first published by the European Commission in 2013. Since then, several versions have been developed to meet the changing requirements and developments in the field of digital competences and to reflect progress in this area. Here are the main versions:

1. DigComp 1.0 (2013): The first version of the DigComp framework was published in 2013, laying the groundwork for the definition and description of digital competences.

2. DigComp 2.0 (2016): This revised version was published in 2016 and included some updates and additions to better meet the changing requirements for digital competences.

3. DigComp 2.1 (2017): A minor update to DigComp 2.0, released in 2017. It included some minor adjustments and clarifications.

4. DigComp 2.1 (2018): Another update, released in 2018, to further refine the framework and adapt it to current developments in the field of digital competences.

5. DigComp 3.0 (in development): It is expected that a new version, DigComp 3.0, will be developed to meet current and future requirements for digital competences. This version is likely to include further updates and adjustments to meet the constantly changing digital landscapes and new requirements for digital competences.

Each version of the DigComp framework is based on research findings and a broad consensus of experts in the field of digital competences. It is regularly updated to ensure that it remains relevant and applicable.



## When were the different DigComp versions released

: Quellen



Let's ask Perplexity!

### 龄 Antwort

The different versions of the Digital Competence Framework (DigComp) were released as follows:

- DigComp 1.0 was released in 2013.
- DigComp 2.0 followed in 2016.
- DigComp 2.1 was released in 2017.
- DigComp 2.2 was published in February 2019.
- The most recent version, DigComp 2.3, was introduced in January 2023 3 4 5.

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2 ..



Let's ask explicitely!

## is there a plan to release digcomp 3.0 in the future

:물 Quellen



### 檊 Antwort

Based on the provided sources, there is no explicit mention of a plan to release DigComp 3.0 in the future. The latest versions discussed are DigComp 2.2 and DigComp 2.3, with DigComp 2.3 being the most recent iteration available since the end of 2022 <sup>(2)</sup> <sup>(4)</sup>.

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### Time Management Task Planning and Prioritization:

help plan a research schedule, suggest effective time management techniques, and break down large tasks into smaller, manageable subtasks

### Productivity Tools Integration recommend tools and methods for maintaining productivity and balance





### Literature Research

### Literature Summaries

provide summaries of existing literature, identifying key points and research gaps

Concept Explanation explain complex concepts or methodologies encountered during literature research









### Lectures Lesson Planning

help generate structured lesson plans and suggest effective didactic approaches for diverse classroom settings **Content Generation** provide supplementary teaching materials, quizzes, or case studies for

### lectures

### **Digital Teaching Aids**

assist in creating interactive digital content, such as presentations or simulations, enhancing online and hybrid learning



### Presentation Presentation Development

assist in crafting presentations, suggesting structure, content flow, and key points

### Speech and Q&A

Preparation

simulate audience questions and provide feedback to help improve public speaking skills









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# ChatGPT-and-Artificial-Intelligen... − つ + 1 /15 🖗 Q

### ChatGPT

and Artificial Intelligence in higher education

Quick start guide

Education 2030

#### UNESCO – a global leader in education Th Education is UNESCO's top priority because it is a UN

basic human night and the foundation for peace and sustainable development. UNESCO is the United Nation' pecialized agency for oducation, providing global and regional leadership to drive progress, strengthening the resilience and capacity of national systems to serve all learners and responding to contemporary global challenges through transformative learning, with special focus on gender equality and Africa across all actions.

The Global Education 2030 Agenda UNESCO, as the United Nations' specialized agency for education; is entrusted to lead and coordinate the Education; 2030 Agenda, which is part of a global movement to cardicate povery through 17 Stutianable Development Goals by 2030. Education, essential to achieve all of these goals, has its cown dedicated Goal 4, which aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all." The Education 2030 Framework for Action provides guidance for the implementation of this ambitious goal and commitments.

### Education

### Chat

For further details on DALL.E 2 and its functionalities, you can explore resources provided by OpenAI and related research publications on text-to-image generation models.

### when should i use generative ai

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- Generative AI, such as DALL.E 2, can be utilized in various scenarios across different industries and applications. Here are some common situations where generative AI can be particularly beneficial:
- Content Generation: Generative AI can be used to create diverse forms of content, including text, images, videos, and music. It can assist in generating creative assets for marketing campaigns, social media posts, storytelling, and more.
- Design and Creativity: Generative AI can aid designers and artists in generating new ideas, visual concepts, and artistic creations. It can be used to explore different design options, generate artwork based on textual descriptions, and inspire innovative designs.
- Personalization: Generative AI can help personalize user experiences by generating tailored recommendations, product suggestions, and content based on individual preferences and behavior patterns.
- Simulation and Prediction: Generative AI models can simulate realworld scenarios and predict outcomes based on input data. This can be valuable in fields such as finance, healthcare, and climate modeling.
- 5. Data Augmentation: Generative AI can be used to augment datasets for training machine learning models. It can generate synthetic data to enhance the diversity and size of training datasets, leading to improved model performance.
- 6. Anomaly Detection: Generative AI models can identify anomalies or outliers in data by learning the normal patterns and generating data points that deviate from the norm. This can be useful for detecting fraud, errors, or unusual patterns in various datasets.
- Conversational Agents: Generative AI can power chatbots and virtual assistants that engage in natural language conversations with users. These AI systems can provide information, answer queries, and assist users in various tasks.
- 8. Art and Entertainment: Generative AI can be used in the creation of

Ask any question..



### TASK

## **Develop Research Questions with Elicit**

### • Task:

• Choose a research project or research question that interests you or that you are currently working on. Use **Elicit, SciSpace** and **Research Rabbit** to further develop your research question and structure the research process.

### • Approach:

- Enter your research question in Elicit and examine the suggested research literature.
- Discuss the results in small groups and consider the benefits and challenges of using Elicit in your research process.



### TASK Analyse papers with SciSpace and ChatPDF

### • Task:

- Choose a scientific article that is relevant to your field of research. Use SciSpace or ChatPDF to analyse the article and extract the most important content.
- Approach:
  - Upload an article to ChatPDF or use SciSpace and have the most important sections, key messages and summaries generated automatically.
  - Use the extracted information to formulate critical questions raised by the article.
  - In small groups, discuss the questions generated and reflect on how using these tools can improve your ability to quickly analyse and understand complex scientific texts.



### TASK Translate and paraphrase research texts with DeepL und QuillBot

### • Task:

 Choose a paragraph from a scientific article or research document that you use frequently or that is important for your work. Use **DeepL** to translate this paragraph into another language and then translate it back into the original language.

### • Approach:

- Copy the paragraph into DeepL or QuillBot and translate it into another language (e.g. from German to English).
- Translate the text back into the original language and compare the changes or adaptations resulting from the double translation.
- Discuss in small groups how accurate and reliable DeepL is for the translation and paraphrasing of scientific texts. Think about how you could use DeepL in your research process.





Cheating

Hallucination

## What challenges are we facing? Deskilling Let's talk about AI – Academic Integrity

Lack of motivation

Question of e.g.Meartiethermessis



