

ChatGPT: water sector applications / Webinar 26th April 2023			
Question No.	Question	Answer	Presenter Name
1	field groundwater investigations - how can AI be used to inform field hydrogeologist overseeing drilling and hydraulic parameter testing of available information from surrounding area wells in a usable form and groundwater modeling applications		
2	Can chatgpt be potentially used as a 'personal investigator' for research and work since many information are uploaded to cloud?		
3	Could it be possible in the future to incorporate deep learning with gpt in a way that we can obtain global-level data?	As more data becomes open data and is available via API I would anticipate that this could be come possible. I have not tried it - perhaps give it a go and see what results you get.	Richard Crowder
4	How accurate these chatgpt results are ?? Can we blindly rely on these results generated for given qstn ??	Defently do not blindly rely on these results. I have numerous examples of where the results oare clearly wrong. For example from the testing that I have done, I asked how do I do X with modelling application Y, the answer was completley wrong. I suspect this was because the data in the software applications knowledge base and training material was not current or was limited.	Richard Crowder
5	How chatgpt is going to reveloutinioze in water sector in coming years??		
6	What does the potential of application of LLMs and/or the infrastructures that they use (i.e., transformers) to time series prediction?	AI is already being used in many water applications, for exampl flood forecasting in rivers and drainage systems, however the success is very deendent upon the data sets available. Where I have seen it be very succesful is for water companies who have invested in 1,000's realtime sensorns to collect the data and train the AI model. AquaDNA is just one example.	Richard Crowder
7	What does the future of explainable AI look like in the field of water resources?		
8	Are there any contingencies in place to mitigate the risks associated with the application of artificial intelligence in the industry?	Its incumbant on professionals to "police this". There is clearly a risk some will come along and make false claims as to how succesful their AI is, but this needs to be evidence and validated.	Richard Crowder
9	Are there any discussions about groundwater modeling..?		
10	Are there any examples of government departments using ChatGPT and AI for public participation processes?		
11	As a GIS Analyst, many firms are required Python, Java, and other software skills. Is Chat GPT giving any solution or putting some midway that we are just focusing on our water management-related research or issues as a water resource engineer?		
12	Buzz word and interested to understand on utilisation of the ChatGPT		
13	Can AI (such as ChatGPT) be used to create code for software? i.e. Tuflow	It can certainly help, but it needs to be done with an abundance of caution. The Flood Modeller team at Jacobs used ChatGPT to trial development of pythin script for some data science routines. It did not give the full solution but it did significantly speed up the development of the code.	Richard Crowder
14	Can ChatGpT be used for analysis of steep slopes		
15	Discussion points relate to advantages for water modelling. Is there consideration of it uses in plannin, managing, operating water and wastewater supply schemes - i am thinking of ways to reduce reactive works scope using predictive methods to be more proactive.	See response to Q6	Richard Crowder
16	Given Input-output data sets will CHATGPT do the ANN Modeling for me		
17	How AI Chatgpt is used for hydrogeological modelling		
18	How can AI help the water sector?		
19	How can artificial intelligence and machine learning be used to improve the prediction of extreme hydrological events and prevent natural disasters?	You can not prevent natural disaters, however, you can plan for and mitigate the impacts for such events. The use of AI does already play a part in flood forecastng (see respone to Q6) and could potentially be used in weather prediction modelling, for example using a cobmination of hindcast and forecast data.	Richard Crowder
20	How can the use of artificial intelligence help to prevent water scarcity and drought in arid areas?	I am not aware of its use as of todate, but like flooding I suspect it could potentially be used in weather prediction modelling use a cobmination of hindcast and forecast data.	Richard Crowder
21	How Chat GPT can help for finding solution to reduce water use inefficiency?		
22	how chatGpt can be applied to the water world		
23	How do I use ChatGPT to improve my knowledge of water engineering skills	Perhaps it could help you find suitable training material? Give it a try!	Richard Crowder
24	How is water industry prepared for AI applications in Water Engineering	Many organisations are already actively using or looking to use AI to address problmes, for example performance of assets (e.g. pumps) and overflow spills.	Richard Crowder
25	How reliable is AI in providing solutions for remote location with little information available?		
26	How to calibrate human interventions like dams, wires, reservoirs etc in watersheds.	By combining deterministic models with AI models optimal solutions could be developed. This is an emerging area and is something Jacobs are starting to test. During May I will be presenting a case studt at the ASFPM (USA) and FMA (AUS) conferences where Jacobs did 45,000 2D flood model simualtions and used a neural network model to define optimal investment strategies (adaptive pathways), for a 100 year time horizon.	Richard Crowder
27	How to control tail water?		
28	How to use ChatGPT to summarize differences in results between two RAS plans? How to use ChatGPT to connect HMS results into a RAS flow file (via DSS)? How to use ChatGPT to clean & smooth mapped inundation boundaries in RAS Mapper?		
30	How we can increase efficiency of prediction through ChatGPT?		
31	How will chatGPT boost research in Water Resources Engineering and Management.		
32	I am curious about the relationship between ChatGPT and the water sector. I hope will gain interesting knowledge to implement my work in the future.		
33	I am interested in applications for floods and early warning systems	See response to Q6 and Q19	Richard Crowder

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34	I am interested in how ChatGPT can help us quickly explore water resources management options in developing countries		
35	I am interested to participate in this important Webinar as a researcher.		
36	I am keen to hear about AI and hydrology from you!		
37	I am wondering why Iran is not in the countries list.		
38	I have been interested in water resource management modelling. I am looking forward to learn what Chat GPT offers!		
39	I have tried asking basics so far on ChatGPT, excited to hear other people's experiences.		
40	I want to Understand the application of AI (chat GPT) in the prediction of Groundwater quality and aquifer potential		
41	I would like to know the application of ChatGPT in water resources.		
42	I'm very interested in modelling and chatGPT.		
43	in case I cannot make it to the webinar, could it be recorded and shared?		
44	is AI compatible with modeling programs like GoldSim?		
45	Is AI expected to eventually be able to treat GIS data? For example being able to create a continuous river bathymetry by extracting data from transects.		
46	Is it acceptable to use AI platforms like ChatGPT to do research in the water sector?		
47	Is it possible to record this meeting?		
48	Is there a further webinar for groundwater-related topics?		
49	Is there any water balance model that uses AI that has been widely tested It will be interested to know how Chat GPT shall decide		
50	i) What type of equations shall be used for a particular model simulation ? ii) What outlet combination is best to handle incoming flood peak ? And many more		
51	Like to Work through AI/ML Application in field of Water Sector		
52	Pointing out the risks (need to check validity of references); we often do find 50% min are fake.....		
53	Q1) How ChatGPT help us resolve understanding the conceptual Hydrogeological models and comparing it with global Hydro examples 2) How we can improve Ground Water reporting using ChatGPT 3) Aids for Numerical and conceptual GW modelling using AI		
54	Question on ChatGPT capabilities: Is there any way to check what material it maybe using or referencing when it comes up with an answer?		
55	Related to water modeling and chatGPT		
56	Researching machine learning and AI applications in water		
57	Role of ChatGPT in various Ground Water applications		
58	The scientific inconsistencies/inaccuracies from ChatGPT are well known at this moment. It basically invents stories/information - which is what has been created to do. How to handle that and how to guarantee scientific accuracy from AI in the future?		
59	There are security implications of having a lot of people using ChatGPT to help them in their work, OpenAI is probably hoovering up a tremendous amount of sensitive info. How should water utilities use these tools effectively without creating unnecessary risks?		
60	Understanding the role of AI to summarize books and modelling Water Pumps and Piping Instrumentation Diagram (PID)		
61	What application in groundwater investigation and remediation strategies we could expect?		
62	What risks are involving AI (e.g. ChatGPT) in water projects? AI is known to be fallible.		
63	What will happen if the input information of ChatGPT tool needs to be updated continuously? I understand it will be useless as its reported results will need to be updated. Is it correct?		
64	While the focus is on water modeling, what are your thoughts on the applicability of ChatGPT and other AI tools in the broader water sector beyond modeling particularly in developing countries?		
65	Will AI mean a paradigm shift with respect to traditional modeling methods?		
66		https://www.theverge.com/2023/1/17/23558516/ai-art-copyright-stable-diffusion-getty-images-lawsuit	Kyle Thomson
68	Currently, I am working on a project related to the demineralization of groundwater. It would be interesting to learn how AI technology can be used to develop codes or maps in this area.		
69	Anything with ChatGPT scripting. I recently got it to write a script to filter and export DSS results for our model calibration efforts, as well as being a reliable generator of otherwise labor intensive excel formulas		
70	Applications of AI in the water sector in Africa		
71	I would be interested to automate and optimize the generation of river centerline (and ideally river left and right bankline) from digital elevation model only. Because standard GIS functions generated a significantly fragmented (i.e. not continuous hydrographic network line) it would be highly interesting to see if AI could smooth and reformulate the centerline to a continuous smooth line, so as to be used in models (e.g. HECRAS).		
72	I'm a postdoc in hydrological modeling and remote sensing, I would like to participate in your interesting training		
73	Can we use it to try theoretical or numerical modeling of problems on hydraulics?		
74	What should simulations in water resources in the future look like? Can we replace ML with hydro systems models?		
75	hydrological and hydraulic modeling input parameters sensitivity		

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76	Please discuss on API as well		
77	What is the potential for application of LLMs and/or their underlying infrastructures (i.e., transformers) in timeseries forecasting?		
78	What does the future of explainable AI look like in the water resources industry?		
79	How is AI used in flood risk mapping, water management, flood forecasting		
80	How can this tool ChatGPT impact the water sector? What can be the effects?		
81	Can CHATGPT also be beneficial in analyzing hydrogeophysical data for example electrical resistivity ?		
82	Given the increasing concerns about water scarcity and climate change, how can AI, ML, and LLM technologies be integrated to develop more accurate and adaptable predictive models for water resource management?		
83	As AI, ML, and LLM technologies become more prevalent in the water sector, how can we ensure that data privacy and security concerns are addressed while maintaining transparency and promoting trust among users?		
84	What are the key challenges in adapting AI, ML, and LLM technologies for real-time monitoring and decision-making in water infrastructure management, and how can these challenges be overcome?		
85	Can you discuss any potential limitations or biases in the current AI, ML, and LLM models when applied to the water sector, and how could these limitations be addressed to improve the overall efficiency and accuracy of these technologies?		
86	How can AI, ML, and LLM technologies be used to optimize the balance between water demand and supply, considering the importance of equitable water distribution among various stakeholders, including agriculture, industry, and domestic consumers?		
87	What are the ethical considerations surrounding the implementation of AI, ML, and LLM technologies in the water sector, and how can we ensure that these technologies are developed and deployed responsibly and sustainably?		
88			
89	How to use CHATGPT with HEC RAS?		
90	Can artificial intelligence be helpful in predicting hydrology for a particular year?		
91	How to delineate fracture aquifers in basement from existing borehole data ?		
92	Have you used AI in water industry? What kind of project? Does it successful? How do you assess accurately and performance? Could you give an public instruction to apply it?		
93	I am a researcher in the field of renewable energy and I recently heard about ChatGPT. I registered for this webinar to gain more information and knowledge about AI and how it can assist researchers and advance science.		
95	What resource pool does the AI dig into and obtain its information from? Is it the whole www where unreliable misleading information would also be there. Is it pre 2019? Can we train it to look at professional manuals and guidelines and suggest us the legitimate procedures, obtain our approval and perform hydrologic designs?		
96	My question is around what considerations are there for staff using sensitive data as prompts for the language model. Is there a risk that sharing intellectual property may result in that data being incorporated into the models future training? Should an organisation develop guidelines around what information can be supplied to the service?	G'day Brent, For the more popular LLMs it's unlikely the prompts you provide will be directly used to train the model in the future, developers would need to filter out the rubbish prompts (ie 2 + 2 now equals 5). I would be careful using proprietary or confidential information when prompting LLMs anyway because there's no guarantee the data wont be leaked or accessed another way. There's been a few news articles on leaked data of recent like this: https://www.laptopmag.com/news/do-not-share-your-secrets-with-chatgpt-this-leak-shows-why there was also a bug with chatgpt a couple months back when other users prompt history was being shared between accounts... depending what service your organisation provides guidelines or restrictions should be implemented now its grown in popularity	Kyle Thomson
97	Should organisations push for secure (either locally hosted or private cloud) versions of these services?		
98		organizations are concerned about inadvertently using confidential information for training an AI, also how to QA/QC the AI responses. We're definitely working on internal guidelines for how to incorporate AI as well as when you shouldn't.	
99	Realistically most Hydrologic DATA should all be Open Source ?	Realistically most Hydrologic DATA should all be Open Source ?	
100		100% agree Rudy	Kyle Thomson
101	Could we force the LLM to focus the search space to a specific region or time period and tune the output?	Thanks, this is a very relevant question. In fact this happened to Samsung electronics not too long ago when they were using ChatGPT. ChatGPT has now implemented a possibility to opt-out of your data being used in training etc. It is also important to note that this was with ChatGPT whilst their API has different (more confidential) use policies	Clemens Cremer
102		Yes you just need to provide the right prompt, this might cause a hallucination though so exercise with caution	Kyle Thomson

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103	Could we force the LLM to focus the search space to a specific region or time period and tune the output?	<p>I asked GPT4 to clarify, see response below:</p> <p>Yes, you can guide ChatGPT to focus on a specific region or time period by providing more explicit instructions in your input. You can also fine-tune the model on a dataset tailored to your desired context in order to improve its performance in generating relevant responses. Here's a brief overview of these two methods:</p> <p>Providing explicit instructions: When you ask a question or provide a prompt, make sure to include details about the region or time period you're interested in. For example, instead of asking, "What were the primary occupations of people?", you could ask, "What were the primary occupations of people in ancient Egypt?" This helps the model to narrow down its search space and generate more focused responses.</p> <p>Fine-tuning the model: You can create a custom dataset that focuses on your desired region or time period and use it to fine-tune ChatGPT. This will help the model become more knowledgeable and generate more accurate responses in Great question Muhammad. From my point of view the AI Models can do a tremendous job in communicating to different audiences and thereby enable informed citizens even if they previously had no technical education. I also see that these models can be personalized teachers</p>	Kyle Thomson
104	How can AI language models help address issues of social and environmental justice in water management, particularly in marginalized and under-resourced communities?	<p>I also see that these models can be personalized teachers</p>	Clemens Cremer
105		Thank you very much	Muhammad Bilal
106	Question for Kobra, as a long-term expert in AI, are surprised by the speed of new developments in capability. E.g. GPT3.5 --> GPT4.0. Did you expect to see this capability so quickly?	The technology of LLMs has been there, the hardware requirements was so high that even a country could not invest on that. And yes it is a surprise regarding how good and close to human text you can get	Kobra Etminani
107	how come that references are beeing 'fakely' created some time?	probably hallucinations, something for Kobra to clarify I asked GPT4 this question, response below:	Kyle Thomson
108	Do LLM weight the source of information to formulate an answer? or does an opinion from the general public member weigh the same as that from a peer reviewed source? And how does this influence the output?	<p>As an AI language model, I am trained on a diverse range of texts from the internet, including both expert opinions and those from the general public. While the training data includes peer-reviewed sources, news articles, and various other high-quality sources, it also consists of content generated by non-experts or even incorrect information. The model does not inherently assign different weights to different sources of information.</p> <p>However, during training, I learn to identify patterns, correlations, and commonly accepted knowledge. Consequently, I tend to produce answers that are consistent with widely accepted information or expert opinions. Still, it's important to remember that I am not perfect and can sometimes produce answers that are not entirely accurate or that reflect biases present in the training data.</p>	Kyle Thomson
109		The output I generate is influenced by the way questions are phrased and the specific prompts provided. If you want more reliable or expert-sourced information in my response, it can be helpful to specify that in your question. However, as an AI, I am unable to directly provide citations or indicate specific sources for my responses. It is always recommended to verify the information I provide with trusted sources when accuracy is critical.	Kyle Thomson
110		How each LLM weights the response is probabilistic (you can get a different response for a new chat) and often confidential the methods used	Kyle Thomson
111	One thing that I find dangerous from chatGPT is that it shows inaccurate information, but, because it is a sophisticated LLM, it seems right. What are the suggestions to use those AIs correctly so that the rubbish can be separated from the right information?	<p>Hi Lucas, you are absolutely right. This false information aka "Hallucinations" are a problem to be taken seriously. A low hanging fruit is to prompt the model right. So, before asking a question, tell the model to be honest "If you don't know the answer say: I don't know".</p> <p>More sophisticated solutions would include e.g. reinforcement learning with human feedback.</p>	Clemens Cremer
112	What do we call a "parameter" in that context? Is that the same as an artificial neuron?	yes, each neuron has a weight attached to it, called parameter	Kobra Etminani
113	Do we have the hardware revolution needed for such a huge training data processing in place now available? ??	yes there are, NVIDIA is providing a number of them, but expensive to have at home!	Kobra Etminani
114		My view is crypto mining already created the revolution that ML training needed	Kyle Thomson
115	https://chat.openai.com/ definitely can create code: The quality of the code is at times questionable. So be careful !	live answered	Richard Crowder
117	How much control do we have over the fine-tuning process? Can this process be done by the AI itself? Pros and cons?	good point, there are different ways of writing "prompts", and one can use LLMs to write that as well.	Kobra Etminani
118	ChatGPT can write RASController code	Brilliant!	Chris Goodell
119	ChatGPT is censured. Has the model been trained with inappropriate content (how to create a bomb) and therefore it is potentially aware of sensitive information or it has just been trained to detect what is inappropriate in order to avoid an answer that it has not been trained for?	these models have no understanding over good/bad, it is human that defines these for them. So it is very much related to what human has told them! There is no ground truth in many areas and there comes human interpretations...	Kobra Etminani
120		Indeed true. Does this mean that the training data was pre-filtered for potentially dangerous data or ChatGPT has been trained with EVERYTHING, but censored after training before public distribution, in your opinion? Thx for your time, much appreciate it!	
121	How can we effectively balance the use of AI with human judgment and expertise in water management, and what strategies can we employ to ensure that AI is used as a complement rather than a replacement to human decision-making?	very good point, the best way of using AI is to use it where human lack and not a replacement.	Kobra Etminani
123	There is obvious dangers on relying on AI alone just like automated Tesla cars- same goes with ChatGPT.		

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124	If LLMs have been trained using data on the internet, will be there any copyright breach when it uses the data for training? If it only uses one category of data, like news, or IT blogs, it will be highly biased towards these industries.	There's already legal disputes arising around what AIs have already been trained on and if its proprietary (ChatGPT, DALL-E, MidJourney ect). Getty Images is suing Stability AI, creators of popular AI art tool Stable Diffusion, link here https://www.theverge.com/2023/1/17/23558516/ai-art-copyright-stable-diffusion-getty-images-lawsuit I would be careful using LLMs outputs for commercial use without doing due diligence that a copyright breach won't occur	Kyle Thomson
125		Agreed Kyle - using LLMs (or any AI model) we need to ensure due diligence, as well as being aware of Bias. Similar to humans, bias is always present, so any model trained on biased data will also be biased .	
126	There are number of Chat GPT Apps for Iphone. Which is the latest one and genuine for Iphone?	I would be using the webapp for now, I don't think any of them are "legit" and could be scraping your data	Kyle Thomson
127	Can you train ChatGPT to use software s by feeding information from software's manual ?	You can. There are e.g. examples with Blender. However, the main thing chatgpt will be able to do is produce code to interact with your software programmatically. Execution of this generated code would then need to be automated. Agent models can do this. Other than that ChatGPT will offer plugins to interact with Tools such as Wolfram alpha	Clemens Cremer
128	Following on from Pete how far away would private/bespoke LLMs be? Could these be built on an organisations private knowledge base to improve productivity for internal employees? Would this be too costly?	This is already in progress - companies like Databricks have created 'Dolly', and you leverage LLMs yourself using LangChain	
129		Looks like Annemiek answered this well, their's AI LLM "companions" as well that could be retrofit for this purpose	Kyle Thomson
130	The reason prompt engineer is sought after now is, if you give ChatGPT the right prompts, say the specs/parameters/web docs of the software you use/project you are working on, you build the knowledge of the model regarding that specific topic. Then when you ask it to do something specific/clarify something in that area, it does it to near perfect accuracy. Obviously, you need to check it and make sure it is right, but 99% of the time, with the correct prompts, its answered your query correctly/provided you the right solution :)		
131	As far as I know, ChatGPT3 was trained on a snapshot of the internet for year 2021. Now there are two questions: 1. Could we ask questions about webpages today? 2. How much we can trust the answers without fact checking?	True, it is trained on data before 2021! Regarding trust, if you are asking facts, it might be challenging, as it "generates" text based on the info it has been exposed to including those facts.	Kobra Etminani
132	Can we have chatGPT read through PDF reports ??	Sort of. For now you would have to use a programmatic approach, accessing their API and transform the pdf to raw text in a programming language of your choice. Afterwards get embeddings (vector representation of text data). However, I presume it should soon become easier via chatgpt plugins.	Clemens Cremer
133	ChatGPT has a problem with referencing. https://www.theguardian.com/commentisfree/2023/apr/06/ai-chatgpt-guardian-technology-risks-fake-article	True! It is generating, not referring to facts, yet...	Kobra Etminani
134	Hi Chris, were you using ChatGPT or GPT-4 in all these prompts?	ChatGPT.	Chris Goodell
135	Would love to hear from someone using in wastewater modelling preferably in InfoWorks ICM	We use AI for wastewater treatment, but I know that a company called Kando have used AI for wastewater network water quality modelling.	
136	Would love to hear from someone using in wastewater modelling preferably in InfoWorks ICM	by 'we' I mean the company I work for, KDX.ai. Feel free to reach out if you are interested in chatting about AI for wastewater networks.	
137	There's an issue in the AI space that is becoming increasingly more important called black box AI models which are essentially AI systems that are complex and difficult to interpret, making it challenging to understand the underlying logic or reasoning behind their predictions, decisions, or recommendations. How do the challenges posed by black box AI models impact the reliability and interpretability of AI-driven hydraulic and hydrologic modelling, and what steps can be taken to address these concerns in order to improve the confidence of stakeholders in the water sector?		
138	1. My question is there any way that we can ask chatGPT to check the Internet for the available model or available dataset related to model our desired study area. 2. Can we train chatGPT used H&H model to provide us the preliminary results 3. Can we combine H&H model like HEC-RAS with ChatGPT. Maybe the chatGPT can use previous results to make the process of calibration and validation easier.	On 1. there will be plugins available soon enabling ChatGPT to browse the web. You could also use a programmatic approach using the API and crawl some websites. 2. GPT, as I pointed out in my brief appearance, can struggle with the size of data we typically handle.	Clemens Cremer
139	Once we train an LLM for the 1st time, would they keep training themselves on that subject if we want them to ??	Once we train an LLM for the 1st time, would they keep training themselves on that subject if we want them to ??	
140		You will need to keep prompting them new material to train (supervised vs unsupervised learning)	Kyle Thomson
141	Not a ChatGPT question, but more AI in general: I was looking at the Microsoft building footprint database for a western country (reported precision in high 90s% and recall of almost 80%) for a dam breach study, to support Population at Risk estimates. When we compared the buildings in the MS building footprint against how many houses we found visually from Google Earth and from an old manual survey, the MS footprint missed 80% of the homes that we knew of. My company doesn't rely on AI models at all because of many experiences like this, but we know of others who have. What concerns or comments does the panel have on this? I can't imagine the extra liability or error by relying on such AI models		
142	Is it worth paying for the ChatGPT premium or is the free version good enough? I refuse to pay to test this myself, at least for now.	Absolutely worth it. Much faster--saves a ton of what would otherwise be a ton of wasted (waiting) time.	
143		I pay for the premium version but I use it very often for data analytics and software dev, it's worth it for me	Kyle Thomson

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144		I think it is hard to find a general answer to this. This depends on you use cases and frequency of use. It sure will become very interesting as soon as you can use Tools (like wolfram alpha) in the paid version. Otherwise you could also pay on an on-demand basis for the openai API access. This should usually be cheaper and they also offer access to a frontend (website) where you can play with different models and parameters similar to chatGPT	Clemens Cremer
145	As a water modeler, we do repetitive task especially when it comes to GIS workflow. I know we could create our own workflow in QGIS, but could AI be able to do that?	Engineers are already creating plugins that can do this, they will become more popularised in the coming years	Kyle Thomson
146	So what's the difference between ChatGPT v3 versus ChatGPT v4 in simple terms?		
147	There seem to be multiple websites that provide CHATGPT, are they all the same? does anyone recommend a particular one to use?		
148	should engineers have to declare if ChatGPT or other AI Tools have been used in model builds or assessments? Are there regulatory risks or gaps around this?	I think yes.	Chris Goodell
149	should engineers have to declare if ChatGPT or other AI Tools have been used in model builds or assessments? Are there regulatory risks or gaps around this?	Good luck making engineers do anything Jonathan! I think we shouldn't make them declare anything but if they choose to use these tools they should carry the risk	Kyle Thomson
150	Damn! It's getting interesting.		
151	Question to Hans: Is the QChatGPT plugin written in python? Does it work in Mac?	Mac installation /Applications/QGIS.app/Contents/MacOS/bin/python3 -m pip install openai	
152	I would interested in the potential to use ChatGPT to automate the transfer of model Q, V, D, S and L parameters to generate design sheets and following that coding for tender quantity estimation.		
153	What functionalities of QChatGPT are more advantageous than simply using the ChatGPT website?	The main advantage is that you have a panel in QGIS. Hopefully, in the future it can do much more with (spatial) context provided in QGIS. For now there's not much difference with using the chatbot from a browser.	Hans van der Kwast
154	I cant install the AI on QGIS: ModuleNotFoundError: No module named 'openai'	It needs to install dependencies. On Windows this is normally done automatically. You can see if you can install the missing openai python package manually.	Hans van der Kwast
155	Can't rely on chatgpt because it crashes (reply can't be generated) a lot and abstain a user from accessing it, mostly.	The paid version has far less crashes and hangups.	
156	How can we ensure that the data used to train large language models is diverse, representative, and not reinforcing existing biases or inequities in society?	That is not an easy task, an open research question. Even high interest from Elon Musk to introduce "TruthGPT", but generally is there any "truth"?	Kobra Etmnani
157		Regarding Elon Musk's proposal for a "TruthGPT," you could note that while the idea of a language model that prioritizes factual accuracy and truthfulness is certainly interesting, it also raises questions about who determines what is "true" and what biases or assumptions may be baked into such a model. It is important to recognize that there may not be a single "truth" that is universally accepted, and that language models must be developed and trained with a deep awareness of the societal and cultural contexts in which they are deployed. Additionally, it is important to involve diverse stakeholders and communities in the development and training process to ensure that a variety of perspectives and voices are represented in the resulting models.	
158	Is it recommended to use languages other than English? Are answers on other languages as reliable?		
159	Is using AI an issue when it doesn't or can't reference where it got its result from?		
161	If I ask the same question to ChatGPT and QChatGPT, am I likely to get the same response?	yes it happens several times for me.	
162	Engineers are generally under-trained in mathematics and statistics, does Engineering training need to be updated to better equip engineers with these skills to appropriately analyze and critique data generated from AI tools? (Hopefully not too quickly so mathematicians like me can still keep our jobs :p)	100% agree with this, water engineers should have a greater understanding of data analytics / stats otherwise we won't fully understand the processes and limitations behind what we do	Kyle Thomson
163	We use AI models for water treatment and wastewater treatment plant models and optimization at KDX.ai	At Jacobs we use AI in our AquaDNA product. The key thing is you need input data for it to work - so need sensors (IoT)	Richard Crowder
164		Agree - data availability and quality is always key. The first rule of modelling still applies: garbage in means garbage out.	
165	What sort of inputs can be taken by ChatGPT (or other AI)? It seems like many examples so far are just text based. Are other files acceptable? Images, pdf files, videos?		
166		https://www.wolfram.com/wolfram-plugin-chatgpt/	Kyle Thomson
167	Will software begin to have AI Plugins as a standard?	It's already being implemented into windows based software, AI plugins will probably make an appearance for niche tasks to "automate the boring stuff", see my earlier response. Some software like tuflow and flow3d have dedicated python libraries and api's, making developing custom AI by their users possible	Kyle Thomson
168	A webinar on AI and Time Series Analysis in H&H modeling would be nice. Just a suggestion		
169	In particular, translating ICM outputs to design sheets typically required for regulatory submissions and following that, quantity estimation. (all this requires and engineer's knowledge for QAQC).		
170	I wonder if Chat GPT will be able to read data as attached files such as excel files, gis layers... and do the required analysis? Thankyou	i presume this will soon be taken care of via plugins (which are not yet available to a broad audience). You can also use the api and preprocess e.g. excel with a programming language of your choice and convert it to raw text to feed it to chatgpt (either via embeddings or copy paste). But then again, as chatgpt is great with messy data, why not try copy pasting the excel data directly (it doesn't have to look pretty for us humans in the pasted version, chatgpt will handle this). Just remember to check afterwards for correctness :)	Clemens Cremer

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Question No.	Question	Answer	Presenter Name
171	as AI progress, do you see humans/engineers as a final step of stamping/certifying/approving, and take associated responsibilities?	In many jurisdictions, you'd immediately lose your engineer (or other) designation for not being fully involved in the work and not properly reviewing it. Would you take legal and ethical responsibility for people's lives from a software known for hallucinations?	
172	as AI progress, do you see humans/engineers as a final step of stamping/certifying/approving, and take associated responsibilities?	yes and no. Yes, when the results are certified and approved by engineers (who will take all responsibilities, regardless of where the results come from). No, when results are not reviewed by humans	
173	As a group/industry is there a role here for us to 'crowd source' the base/tagged data to train a specific LLM for "us". Can we use an existing LLM to help us do this?		
174	in the end, even with AI, there is the garbage in - garbage out scenario where need to exercise care - all dependant on QA/QCing your data.		
175	thanks, but it still didnt work. there was no openai plugin.		
176	Just Tried run an ANUGA Model generated by Chat, and some key components missing, and it made up some code, that doesnt exist. But did, eventually create a running model !! (So it does learn it seems ...)		
177	can we try to use CHATGPT to write a summary for this meeting? that's will be helpful for everyone :)		
178	Groundwater model calibration is essentially a matter of "training" a model by adjusting parameter values. Is there a move afoot in the groundwater community to use AI in model calibration? Could this supplement or replace a tool like PEST?		
179	Do you think that ChatGPT the last version GPT4 could be platforms like HEC-HMS and HEC-RAS, and generate real models?		
180	Should we take up the arts like painting, sketching, and music to keep ourselves busy because AI will take over H&H jobs?		
181	Can an AI assistant learn from me as I build my hydraulic models and over time, with sufficient learning, build them for me?	AI models are very poor with extrapolating (in LLM this creates "hallucinations") and from my experience no hydraulic model is the same (each comes with a surprise / twist that requires engineers judgement). It can be used to "automate the boring tasks" like META's new released "Segment Anything" for roughness mapping and GIS. I suspect clever hydraulic engineers will keep building more and more AI tools to automate these types of tasks. So the complex, site specific problem solving will be left up to the human. A core part of my business (Forward Hydro) is around this, with some tools to be released late this year or next	Kyle Thomson
182	Can I develop a model, then have a language learning model write a model development summary report?	Yes this is very easy to do with tools like ChatGPT, you will just need to prompt it correctly, I provided an example (attachment 1). The more details you provide the better the report, just be careful with providing confidential information	Kyle Thomson
183	Can I have an AI assistant download all of my material on The RAS Solution, and take over as my technical support bot?	I suspect ChatGPT may have already done this, I provided an example (attachment 3). The AI provided a funny response towards the end 😊	Kyle Thomson
184	Can I have an AI assistant watch me as I build my model, and suggest corrections to me as I'm going? I.e., the AI has access to all the tutorials, guidance documents, user's manuals, etc., and is watching to make sure I don't miss something, or stray outside the guidelines. I'm picturing the scene(s) in Iron Man where Robert Downey Jr. is building something in his shop and he and his virtual assistant Jarvis are constantly talking through how to do it.	There's plugins for ChatGPT that turns it into the modern version of "Clippy", these are still in their infancy. Hydraulic engineering is very niche compared to other fields, it would take a very dedicated water engineer to develop a customised AI assistant for model building and train it on a database of hydraulic specific stuff sufficiently to the point it can follow along and provide advice. I suspect ChatGPT is already trained on alot of this stuff but responses it would provide would be too broad.	Kyle Thomson
185	Can I have an AI learn how to troubleshoot a model?	See response to (3), hydraulic models (ie TUFLOW and FLOW3D) are already very user friendly and provided broad enough error codes that most issues are pre-emptively troubleshoot. Engineers judgement will most likely still be necessary due to site specific problems and AI extrapolating issues.	
186	What about reservoir and canal operations? Can an AI assist operators with gate openings/closings in advance of floods? Imagine an AI running thousands of scenarios in a few seconds and then suggesting the one with the best outcome.	My machine learning hydrology paper attempted something very similar to this except for calibrating hydrological models, a similar approach to what I took would be a good starting point. I think a neural network / AI to do this could be developed and trained relatively easy to aid in operators, the issue being AI models struggle with time series data and extrapolating results which would be problematic when a rare event (ie brisbane 2011 floods) occurs with little to no historic data and the AI starts extrapolating operations. An alternative approach where 100's of thousands of scenarios are stored in a database and ensembles of the most similar inputs are selected through a lookup to aid operators in exercising their own engineering judgement may be a more appropriate approach.	Kyle Thomson
		I can also see plenty of potential litigious issues if an AI is used to inform on operations in advance of a flood. IE if my house has flooded due to a decision made by a "black box" who is liable?	Kyle Thomson
		machine learning paper available here	Kyle Thomson
		https://www.surfacewater.biz/wp-content/uploads/2021/12/HWRS2021_Paper_31_Kyle_Thomson_.pdf	Kyle Thomson
187	What are the concerns? Will it come to a point where we are AI managers, and no longer hydraulic modelers?	My theory is there will be consultants who use AI to deliver work like AI managers, but they wont understand the finer (important) details and outcomes of the hydraulic assessments. We will read about them in court cases one day (see my earlier responses on engineering judgement and AI extrapolation)	Kyle Thomson
188	What are the protocols and best practices for referencing and crediting Chat GPT or other LLMs? D	Depending on the LLM, some are not for commercial use or will require specific referencing or are non-proprietary, you will need to research the specific LLMs terms and conditions you are interested in using. I would exercise caution when using outputs for reports and research without tracking down the proper credits, as LLMs are trained on databases of existing work the potential for plagiarism is high. There are emerging papers that specifically discuss the use of LLMs for writing research papers. example:	Kyle Thomson

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		https://www.sciencedaily.com/releases/2023/03/230323103316.htm	Kyle Thomson
189	What are we not even thinking about with regard to AI and water modeling?	Calibrating models and better statistical methods for estimating model parameters. There's very smart engineers (ie Dr Monte Azmi) with papers on statistical approaches similar to those used in training and testing (when developing a machine learning algorithm) that would provide valuable insight if applied to water modelling.	Kyle Thomson
190	Will AI, Chat GPT, LLM, etc. make us dumber over time, or just more efficient (or both)? Example: Google Maps has made me very bad at finding my way around (without Google Maps), Autocorrect has made me a bad speller, etc.	I think AI tools will speed up the rate of completing projects and delivering work. Go back 10 years and it would take a team of engineers / hydrologists to deliver a flood study, and take them maybe 6 to 12 months. Now they can be delivered to a greater level of detail in < 1 month by a single engineer (depending on the study). With AI fewer engineers will exist in the industry and they will be delivering alot more work than now, I think the bar to entry will be alot higher. Most grads I see struggle to pick up tools like TUFLOW without significant oversight, good luck when they're expected to understand fluid dynamics and operate a range of automation / AI tools, and stay on top of publications and standards. This wont be good for most engineers as the knowledge bar to entry for senior / certifying technical roles will be too high.	Kyle Thomson
		For day to day life AI will definitely cause a trend towards idiocracy, why exercise the problem solving or critical thinking part of your brain when the machine trained on the sum of all human knowledge will just tell you. My concern is who trains the machines.	Kyle Thomson
		My hydrology ML paper is here: https://search.informit.org/doi/epdf/10.3316/informit.342934168443489	Kyle Thomson
		and flash back to surfacewater.biz , there's a free copy here:	Kyle Thomson
		https://www.surfacewater.biz/wp-content/uploads/2021/12/HWRS2021_Paper_31_Kyle_Thomson_.pdf	Kyle Thomson
		You also have Jordan Maultby's papers on AI for GIS Roughness:	Kyle Thomson
		https://www.surfacewater.biz/wp-content/uploads/2021/11/20210427_FMA21_ArtofRoughness_FINALPaper.pdf	Kyle Thomson
		which very interestingly, recently META has released "Segment Anything" which would be a major improvement on Jordans early investigation, more info here:	Kyle Thomson
		https://segment-anything.com/	Kyle Thomson
		and you might have seen videos like this on linkedin:	Kyle Thomson
		https://www.linkedin.com/posts/robcsloan_geospatial-segmentation-earthobservation-ugcPost-7055212666050482176-Xm81?utm_source=share&utm_medium=member_desktop	Kyle Thomson
191	Will AI's talk and share with other AI's? How do we protect proprietary and sensitive material?	There's already legal disputes arising around what AIs have already been trained on and if its proprietary (ChatGPT, DALL-E, MidJourney ect). Getty Images is suing Stability AI, creators of popular AI art tool Stable Diffusion, link here	Kyle Thomson
		Plugins are already being developed to allow AI tools to communicate with each other, there are many already in place for ChatGPT that will change things beyond what we can comprehend (ie Wolfram Alpha has a ChatGPT plugin)	Kyle Thomson
192	Wouldn't ChatGPT's training, whih ended some time ago, limit its ability to "review the RAS Solution website?" In other words, aren't we dealing with what it already has learned (a couple of years ago) and cannot ask it to lern new stuff or do something new?	I think you're correct John.	Chris Goodell
193	Wouldn't ChatGPT's training, whih ended some time ago, limit its ability to "review the RAS Solution website?" In other words, aren't we dealing with what it already has learned (a couple of years ago) and cannot ask it to lern new stuff or do something new?	Thanks, Chris. Very insightful questions and, as always, a great and useful presentation.	