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Inventing in the Age of Generative AI: Patenting Risks and Opportunities

Speaker

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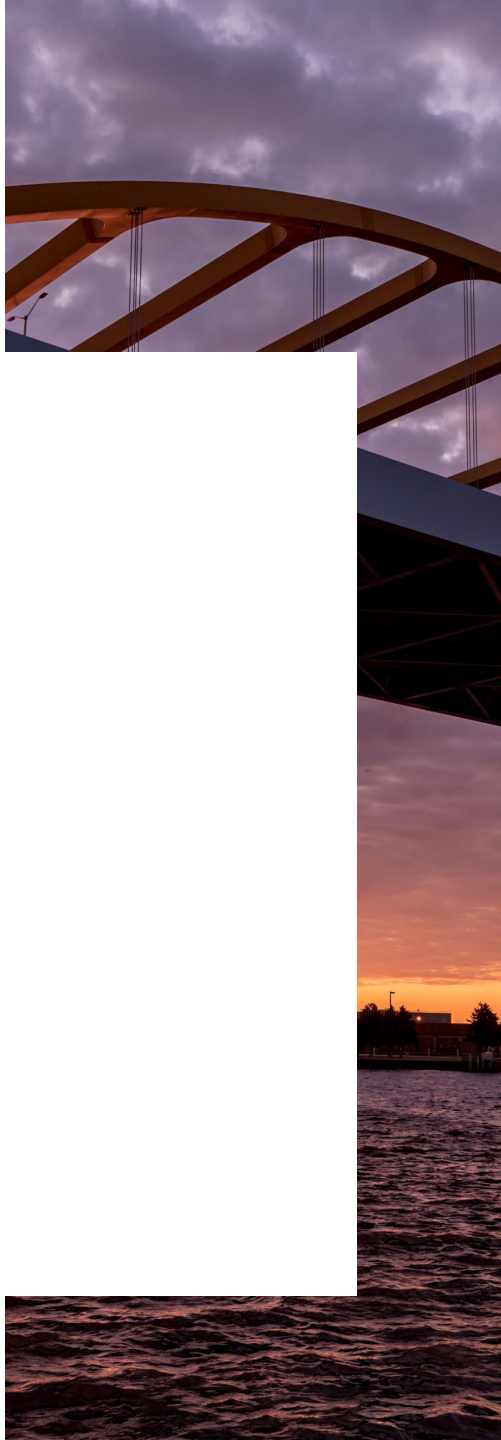
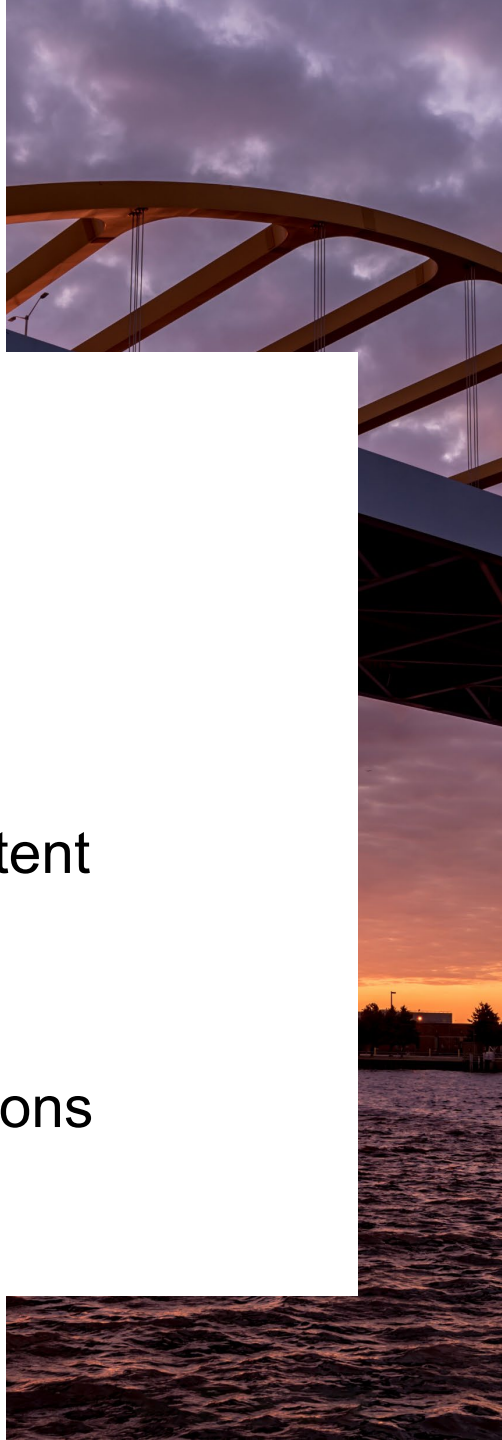


Agenda

- Introduction to Generative AI
- Example Use Cases of Generative AI
- Patent and Trade Secret Issues Related to Generative AI Use
- Inventorship for AI-Assisted Inventions
  - Background on Artificial Intelligence and Inventorship under U.S. Patent Law
  - USPTO Guidance on Artificial Intelligence
  - Examples of Determining Proper Inventorship for AI-Assisted Inventions



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Introduction to Generative AI and Use Cases

What is Generative AI?

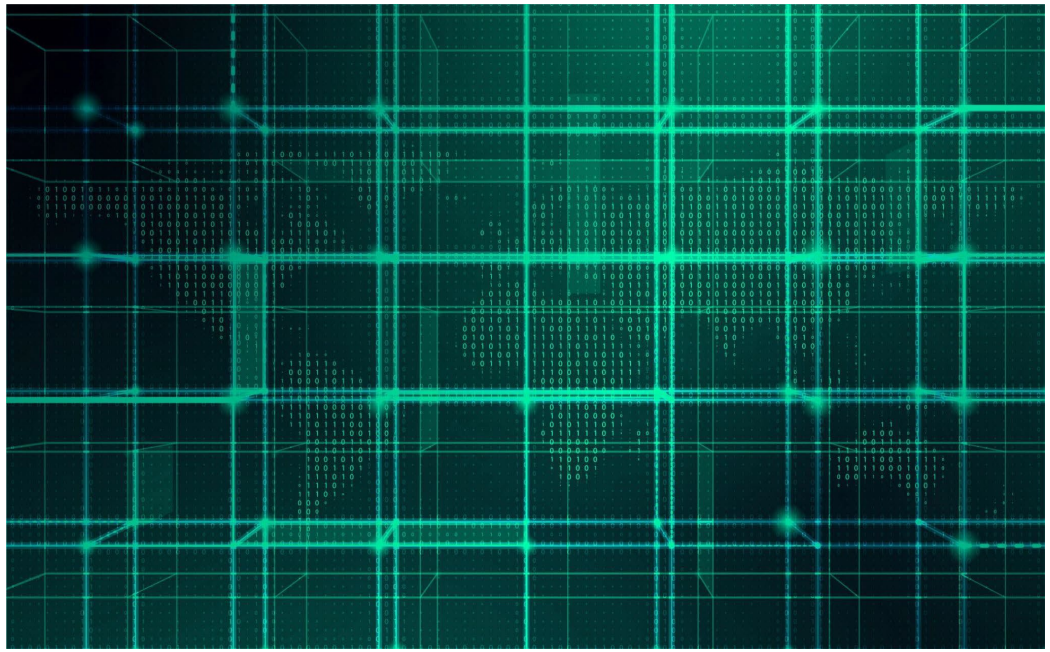
Generative AI Overview

- Uses machine learning algorithms to create new content based on patterns it has learned
- Allows for the creation of new, unique data that has not been seen before.

Applications of Generative AI

- Numerous applications in industries such as art, music, fashion, and advertising
- Used to generate unique content and designs, improve personalization, and create content at a faster rate.
- Increasingly being used by engineers, software developers, and other scientists to assist in developing inventions.

How Does Generative AI Work?



- **Training:** Learns from a large amount of data, like pictures, text, or music, to understand its patterns and how things fit together
- **Inference:** After learning, creates new, similar content by using what it has learned
- **Prompt Engineering:** It can also be directed with specific instructions, or “prompts”, allowing the user to control the form and content of the model output

Types of Generative AI Models

- Examples of Generative AI Models Include:
  - Transformers
  - Generative Adversarial Networks
  - Variational Autoencoders
- Wide Variety of Use Cases:
  - Text Generation (e.g., natural language chatbot)
  - Image/video Generation
  - Music Generation
- OpenAI models like ChatGPT and Dall-E well known, but many others and more every day

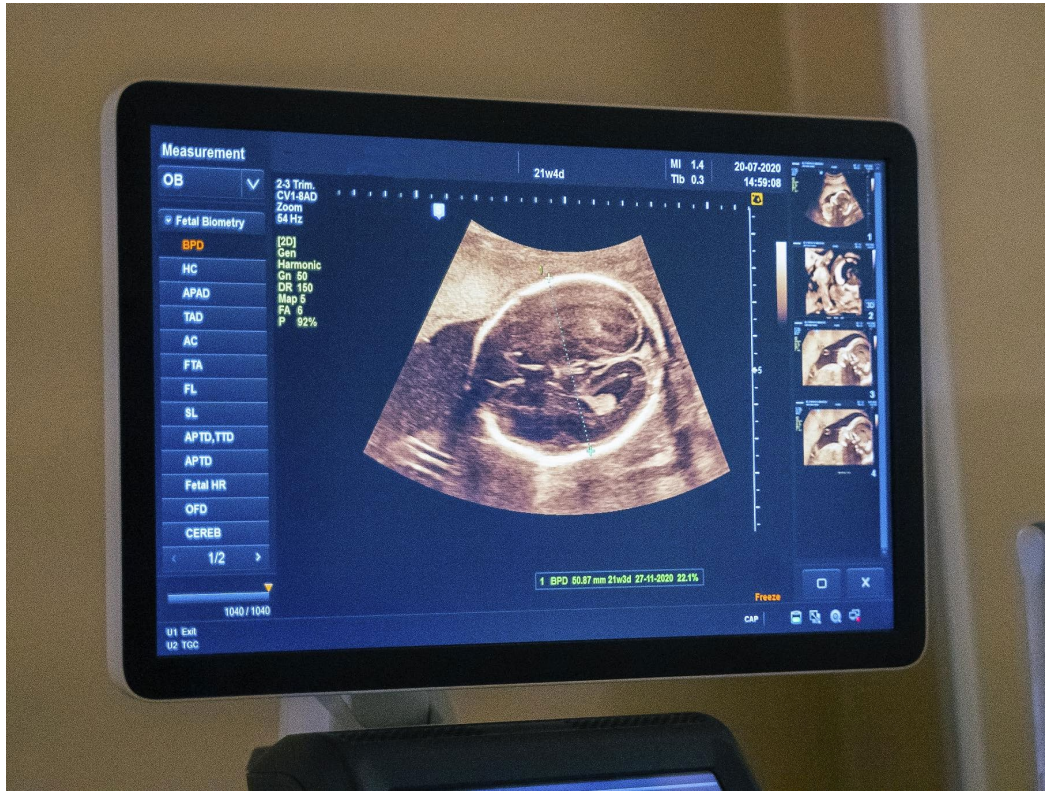
Use Case - Designing a Car Part

- Can help create optimal designs based on specific design criteria
- Can be used to design specific part or groups of parts/subsystem
- Can be used for variety of purposes:
  - Structure
  - Functional features
  - Material composition
  - Ornamental appearance

Use Case - Designing a User Interface for Software

- Can be used to create user interface/user experience (UI/UX) elements for SaaS applications, web applications, mobile apps, etc.
- Can be used for elements such as:
  - Entire interface
  - Content and positioning of elements of interface
  - Flow between multiple UIs
  - Personalization for individual users/roles

Use Case - Medical Imaging



- Examples: X-Ray, Ultrasound, MRI
- Can be used for:
  - Identifying relevant elements within images
  - Analyzing images and providing potential diagnoses
  - Identifying patterns between sets of images (e.g., changes over time/visits)
  - Generating natural language summaries or other descriptive text/images

Use Case - Personalized Recommendations

- Examples: E-commerce, Retail, Streaming Services, Social Media, Parameter Setting for Software, etc.
- Can be used for:
  - Analyzing large data sets and identifying user preferences
  - Customizing software to users/roles
  - Providing individualized offers
  - Assessing user responses to output and automatically fine-tuning/retraining

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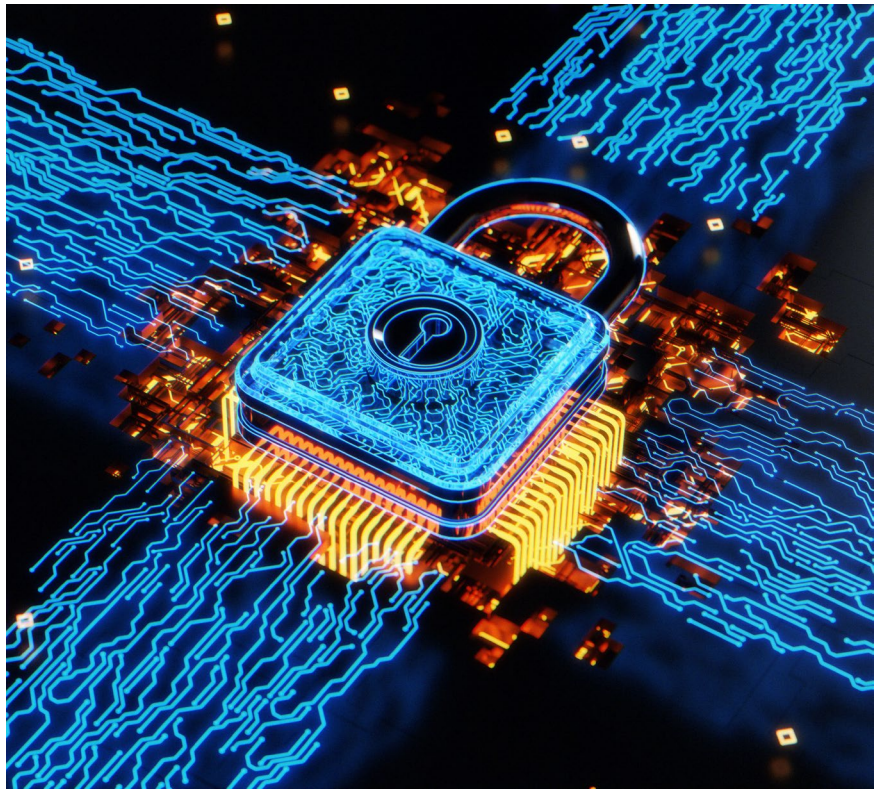
Patent and Trade Secret Issues Related to Generative AI Use

Inventorship and Eligibility

- **AI-Assisted Inventorship**
  - Must have significant human contribution to each claim
  - Improper inventorship can impact validity of patent
  - Discussed in further detail below
- **Patent Eligibility**
  - AI-related inventions assessed using different guidelines
  - But same underlying *Alice* test and same general focus on technical nature of invention
- Subject of guidelines promulgated by USPTO in 2024

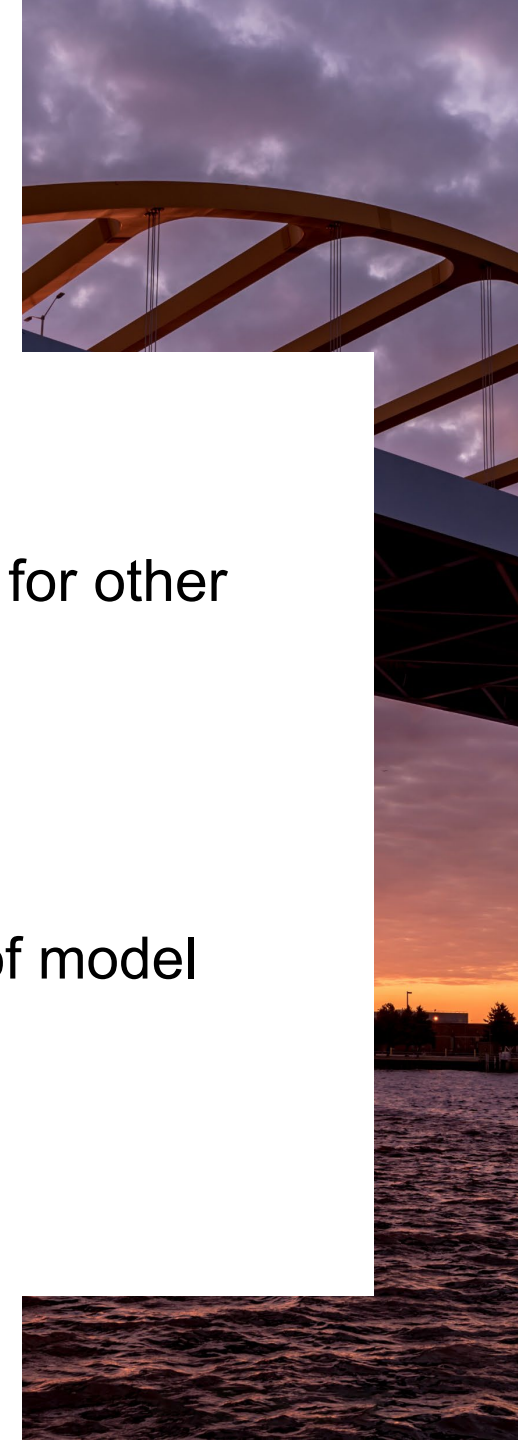
Ownership and Data Secrecy Issues

- Contracting with third parties
  - Using and/or helping develop third party AI models
  - Who owns the IP?
    - Generated directly using the model
    - Using the output of the model as part of downstream development
- Open-source concerns
  - How are open-source models used?
  - Copyleft or permissive license?



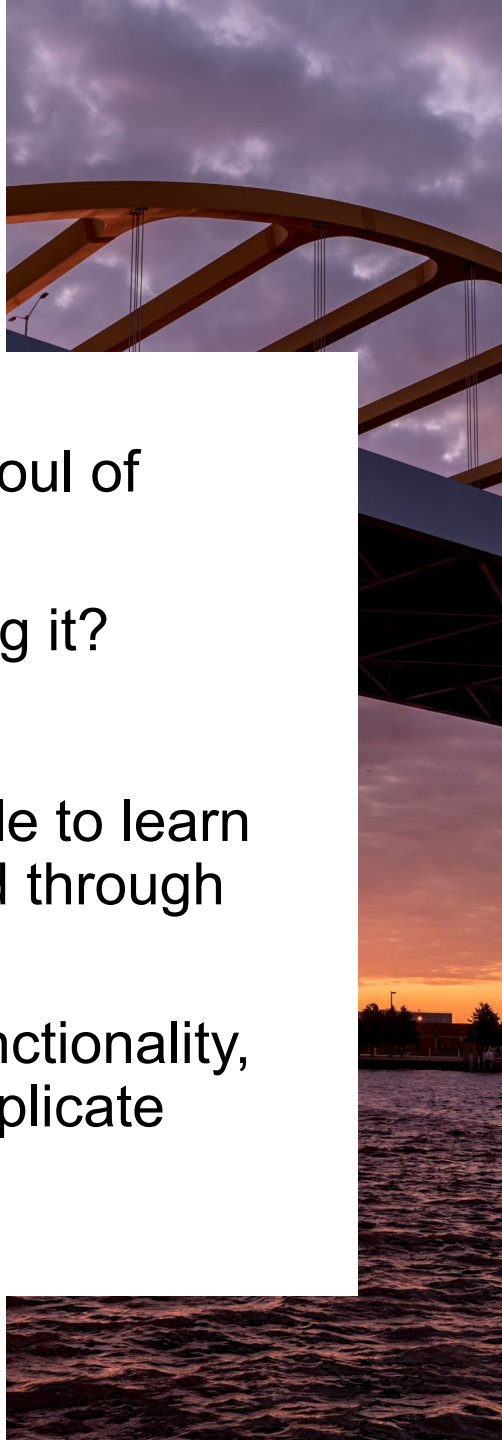
Data Use Issues

- Is your data/customer data used in training or fine-tuning of model?
- Protections in place to avoid that data being used in generating output for other parties?
- Who owns the input data?
- Who owns the output data?
- Who owns the trained model and what restrictions are placed on use of model for benefit of third parties/competitors?
- Recognize and protect the value of your clients' confidential data



Patent Clearance/Freedom-To-Operate

- Use of model, alone or in combination with other activities, could run afoul of others' patent rights
- How well do you understand what the model is doing and how it is doing it?
- Evolving behavior
  - One of the attractive features of Generative AI is the fact that it is able to learn and evolve over time, both through manual retraining/fine-tuning and through self-adaptation
  - Difficulties with clearance analysis – Even if you clear the current functionality, that functionality may change, even autonomously, over time and implicate others' patent claims in different ways than the original functionality



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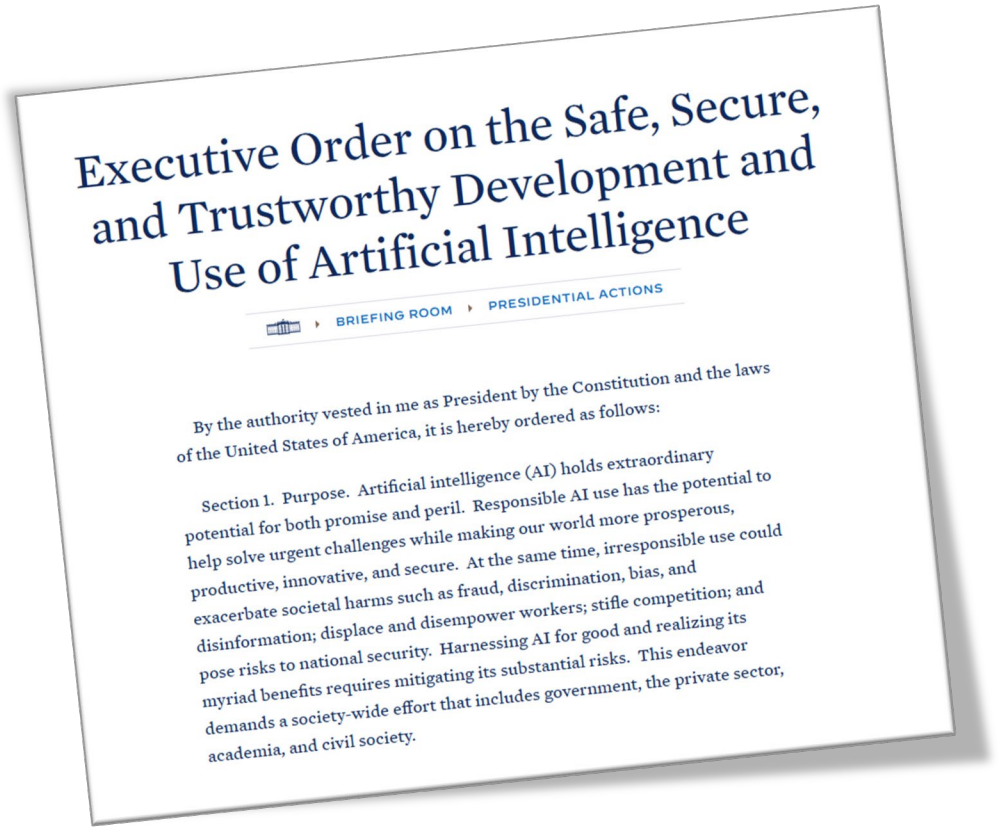
USPTO Guidance on Inventorship of AI-Assisted Inventions

Background on the USPTO Guidance

- President Biden issued an "*Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence*" in **October 2023** and directed the USPTO publish guidance "addressing inventorship and the use of AI, including generative AI, in the inventive process, including illustrative examples in which AI systems play different roles in inventive processes"

- The USPTO issued its guidance entitled "*Inventorship Guidance for AI-Assisted Inventions*" on **February 13, 2024**, to address "how the USPTO will analyze inventorship issues as AI systems, including generative AI, play a greater role in the innovation process"



Executive Order on the Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence

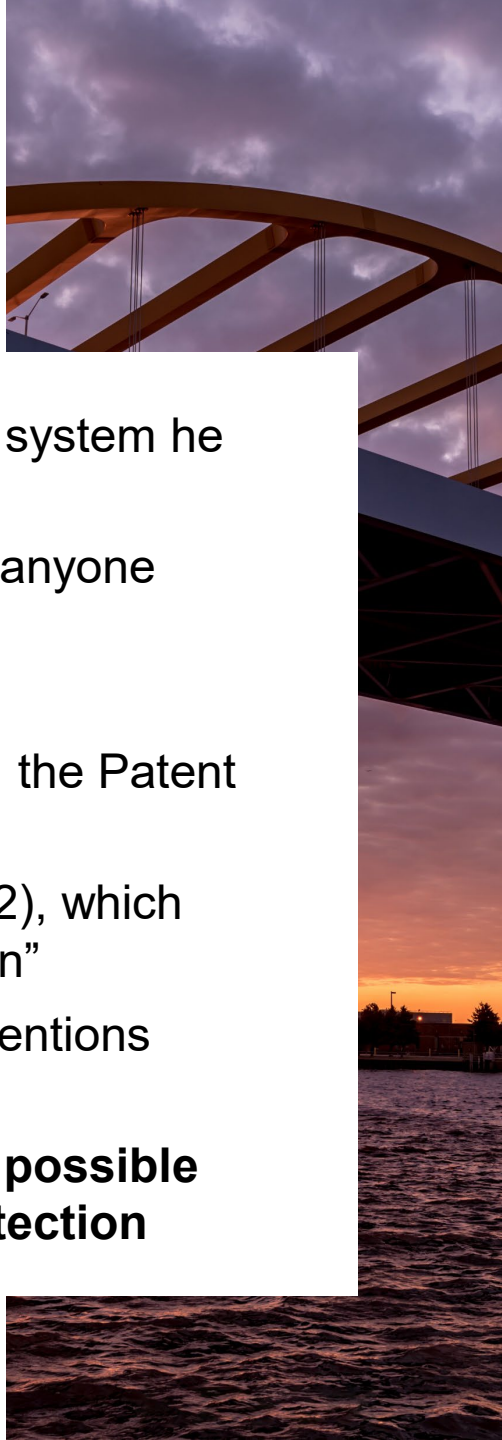
BRIEFING ROOM › PRESIDENTIAL ACTIONS

By the authority vested in me as President by the Constitution and the laws of the United States of America, it is hereby ordered as follows:

Section 1. Purpose. Artificial intelligence (AI) holds extraordinary potential for both promise and peril. Responsible AI use has the potential to help solve urgent challenges while making our world more prosperous, productive, innovative, and secure. At the same time, irresponsible use could exacerbate societal harms such as fraud, discrimination, bias, and disinformation; displace and disempower workers; stifle competition; and pose risks to national security. Harnessing AI for good and realizing its myriad benefits requires mitigating its substantial risks. This endeavor demands a society-wide effort that includes government, the private sector, academia, and civil society.

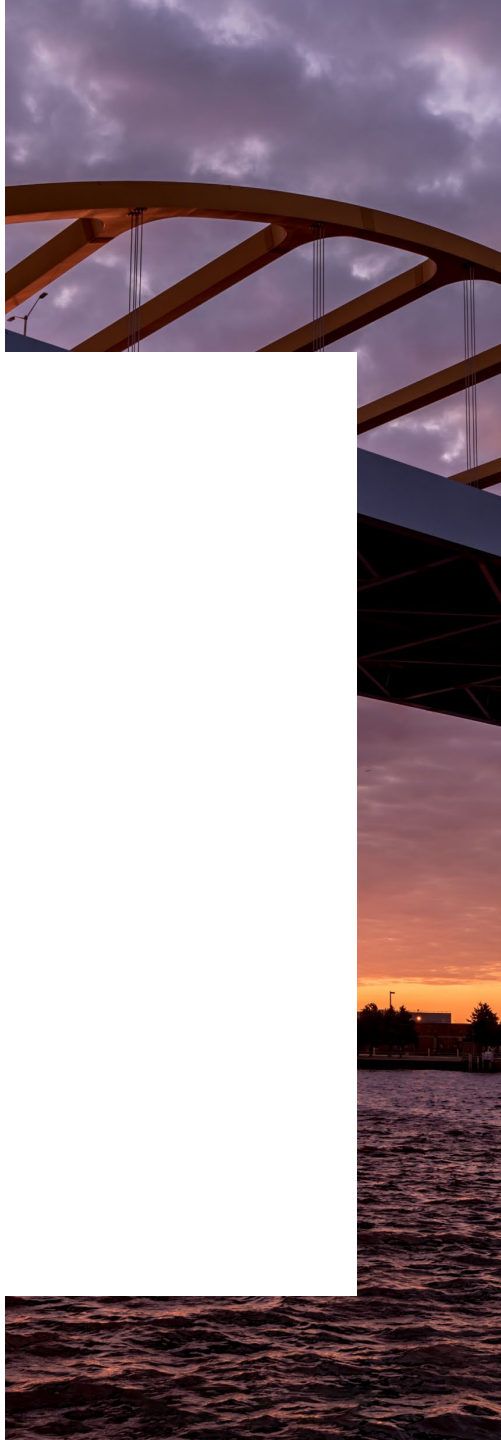
Thaler v. Vidal, Fed. Cir. 2022

- Thaler filed two patent applications on inventions that he alleges were invented by an AI system he developed and listed the AI system ("DABUS") as the sole inventor
- Thaler maintained that he did not contribute to the conception of the inventions and that anyone could have taken the DABUS's output and reduce the inventions to practice
- The USPTO found apps lacked inventor; District Court found same upon review
- The Federal Circuit upheld the District Court's finding, stating that "there is no ambiguity: the Patent Act requires that inventors must be natural persons; that is, human beings"
- The Federal Circuit cited a Supreme Court decision, *Mohamad v. Palestinian Auth.* (2012), which stated that when used "[a]s a noun, 'individual' ordinarily means a human being, a person"
- The Court did note that they were "not confronted today with the question of whether inventions made by human beings with the *assistance* of AI are eligible for patent protection"
- **Thus, under *Thaler*, an AI system cannot be the *sole* inventor on a patent, but it is possible that inventions *made by humans with AI assistance* may be eligible for patent protection**



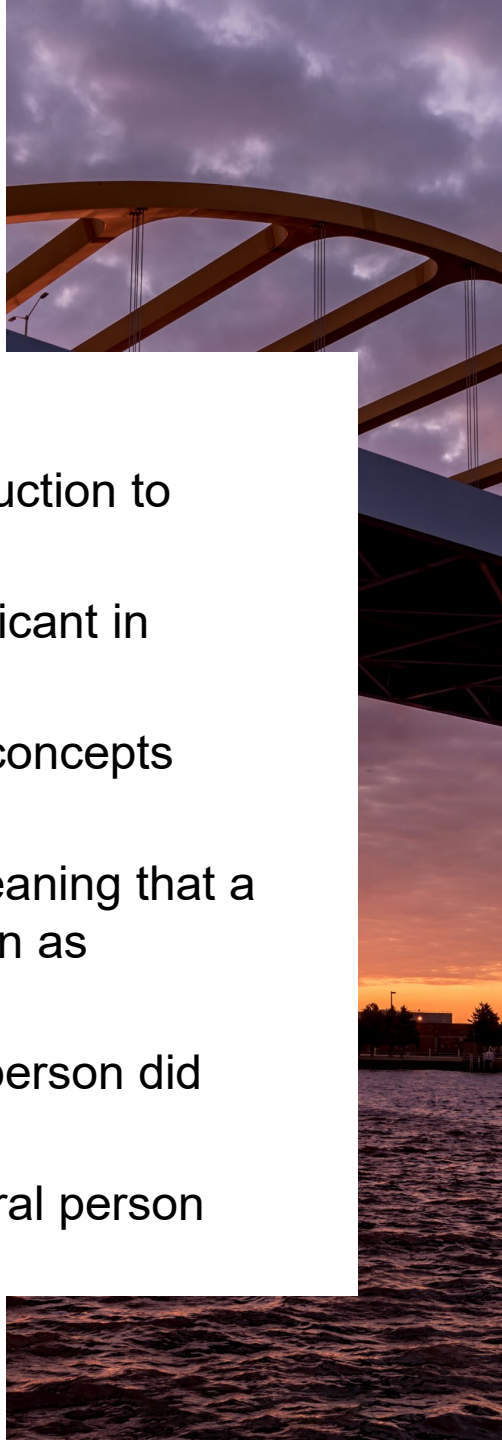
Overview of *Thaler v. Vidal* and Its Applicability to Joint Inventorship

- In addition to the discussion of *Thaler*, the guidance discusses the applicability of *Thaler* to consideration of joint inventorship, which was not raised directly in *Thaler*
- 35 U.S.C. § 100(g) defines "joint inventor" and "coinventor" as "any of the *individuals* who invented or discovered the subject matter of the joint invention"
  - Based on *Thaler*, the "joint inventors" or "coinventors" must also be natural persons
- Any patent applications that name a machine as a joint inventor/coinventor on an ADS or inventor's oath/declaration or substitute statement will be considered to have improper inventorship
  - Must name the natural person(s) who significantly contributed to the invention; must *not* list any entity/AI system that is not a natural person even if the AI system was instrumental in the creation of the invention
  - The guidance recognizes that an AI system *may* perform acts that could constitute inventorship if they were done by humans



Principles for Determining Inventorship of an AI-Assisted Invention

- Courts use the *Pannu* factors to determine if a person is an inventor
  - (1) Each inventor must contribute in some significant manner to the conception or reduction to practice of the invention
  - (2) Each inventor must make a contribution to the claimed invention that is not insignificant in quality when that contribution is measured against the dimension of the full invention
  - (3) Each inventor must do more than merely explain to the real inventors well-known concepts and/or the current state of the art
- For AI-assisted inventions, each claim must have been invented by a natural person, meaning that a natural person must have significantly contributed **to each claim** in the patent application as specified by the *Pannu* factors
- Inventorship is improper when there is **at least one claim** in which at least one natural person did not contribute significantly
  - A rejection under 35 U.S.C. §§ 101 and 115 is proper for any claims on which no natural person significantly contributed and for any application that lists an AI system as an inventor



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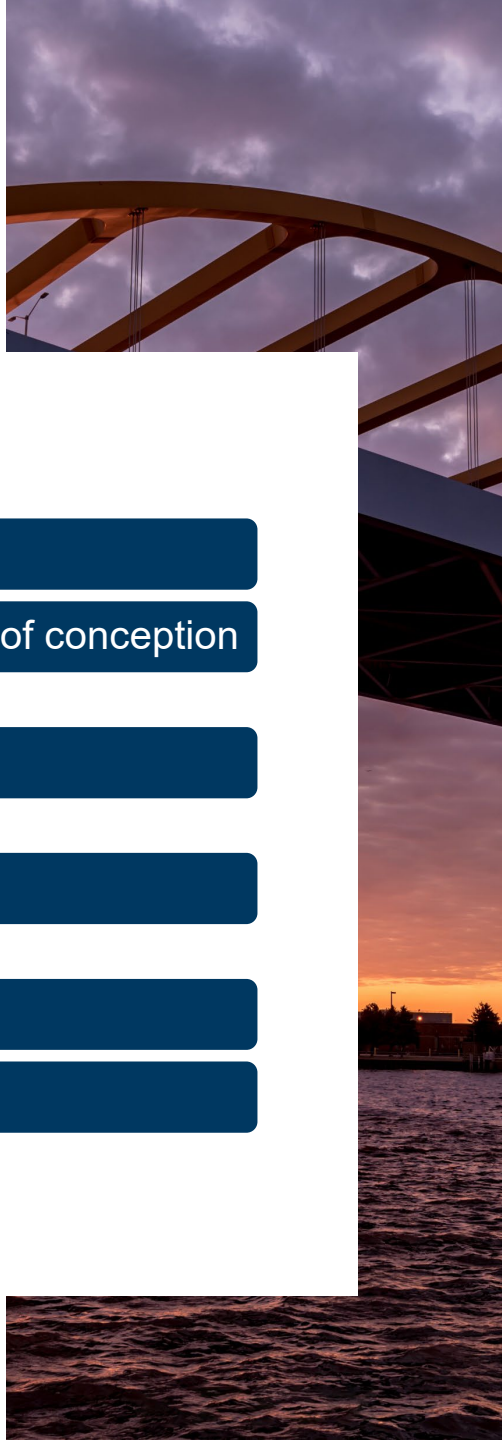

AI use does not negate inventorship, but contribution must be more than use

Merely recognizing a problem or having a general goal or research plan to pursue does not rise to the level of conception

- But prompt engineering may be significant contribution

Reducing an invention to practice alone is not sufficient

- Recognizing/using output of model not enough, but may add significant contribution to output

Creating essential building block may be significant contribution

- e.g., significant contribution in design/building/training of AI system

Owning/controlling AI system is not in itself significant contribution

Guidance applies to all patents, including utility and design patents

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USPTO Examples of Determining Proper Inventorship for AI-Assisted Inventions

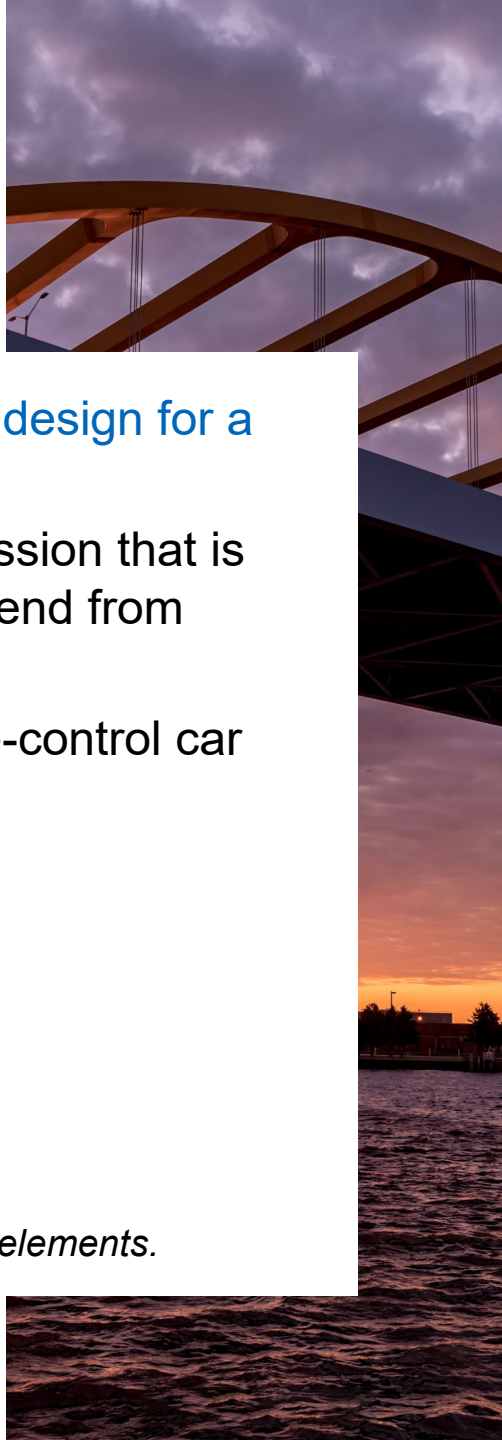
Example

Transaxle for Remote Control Car

- Ruth and Morgan work at XYZ Toy Company and are tasked to develop new remote control cars
- Both recognize that the new car will need a transaxle
- They decide to use AI to create a preliminary design for transaxle for car
- Choose to use “Puerto5,” which is a free publicly-available generative AI system that receives natural language prompts as input and generates text, images, and other media as output

Scenario 1

Merely Recognizing Problem or Having General Goal Not Conception



- Ruth and Morgan provide a general prompt to Puerto 5, which reads "Create an original design for a transaxle for a model car, including a schematic and description of the transaxle"
- Puerto5 includes a preliminary design for a transaxle that comprises a casing, a transmission that is removably mounted within the casing and secured by fasteners, and axle shafts that extend from the casing
- Ruth and Morgan review the output and agree that the design should work in the remote-control car
- XYZ files a patent application with the following claim:

[Claim 1] A transaxle comprising:

a casing;

a transmission;

said transmission separate from said casing and removably mounted within said casing;

axle shafts extending from said casing;

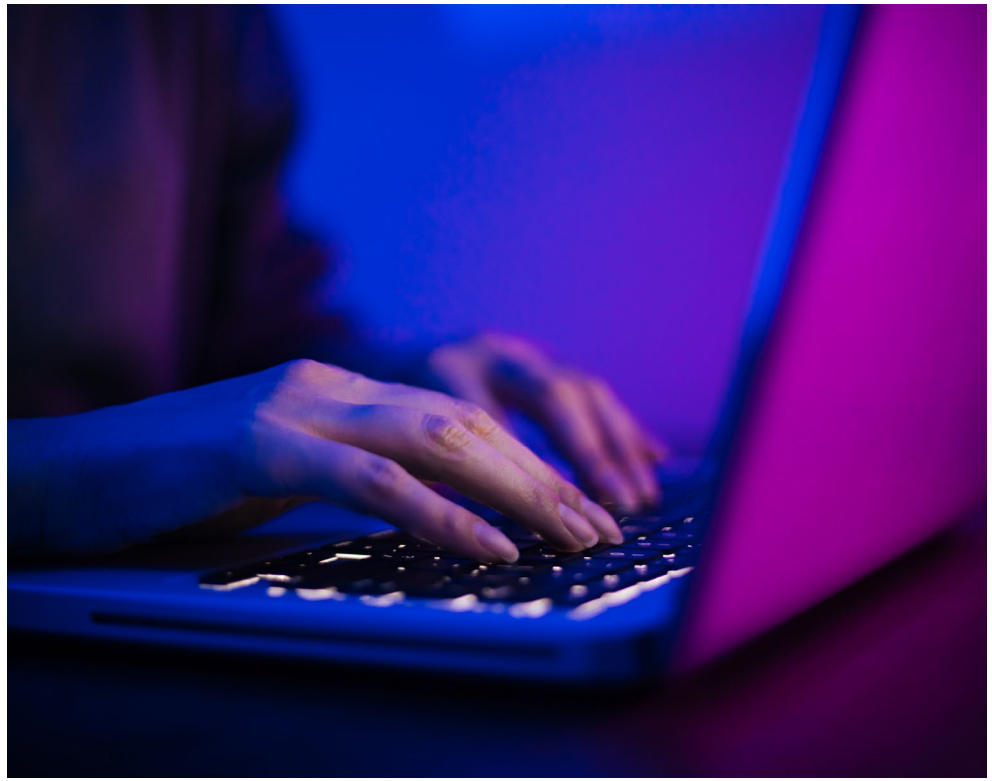
said casing being defined by two separable casing elements of said transaxle; and

a fastener on said transmission that removably mounts the transmission to one of said separable casing elements.

Scenario 1

Merely Recognizing Problem or Having General Goal Not Conception

- Are Ruth or Morgan inventors of Claim 1? **NO**
- No significant contribution to the conception of the claimed invention
- Only contributions were:
  - Providing a broad, general prompt restating the problem
  - Recognizing the solution generated by Puerto5 would work
- Quality of contributions insignificant in view of dimension of the full invention
  - Prompt generic
  - Output used as-is



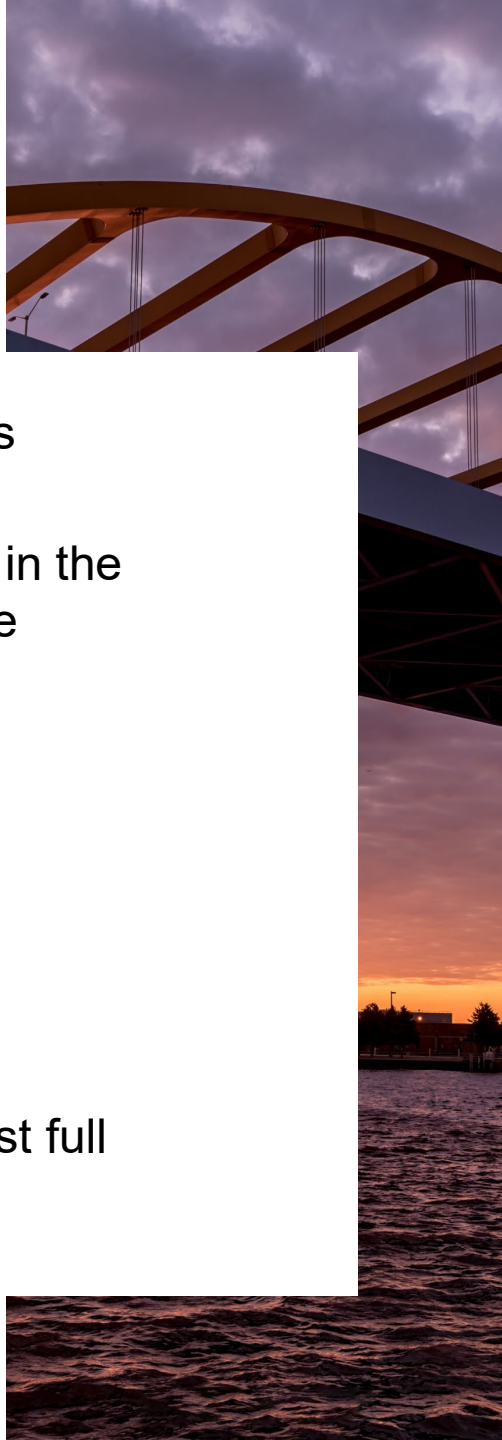
Scenario 2

Reduction to Practice Alone is not a Significant Contribution

- Morgan used the schematics from Puerto5 and builds the transaxle of claim 1 exactly as indicated in the schematic; does not alter the design
- Morgan chooses steel to construct the casing because steel is a common material used in the RC car industry to build transaxles and the company has a large supply of steel available
- Claim 2: “The transaxle of claim 1, wherein the casing is constructed from steel.”

Scenario 2

Reduction to Practice Alone is not a Significant Contribution

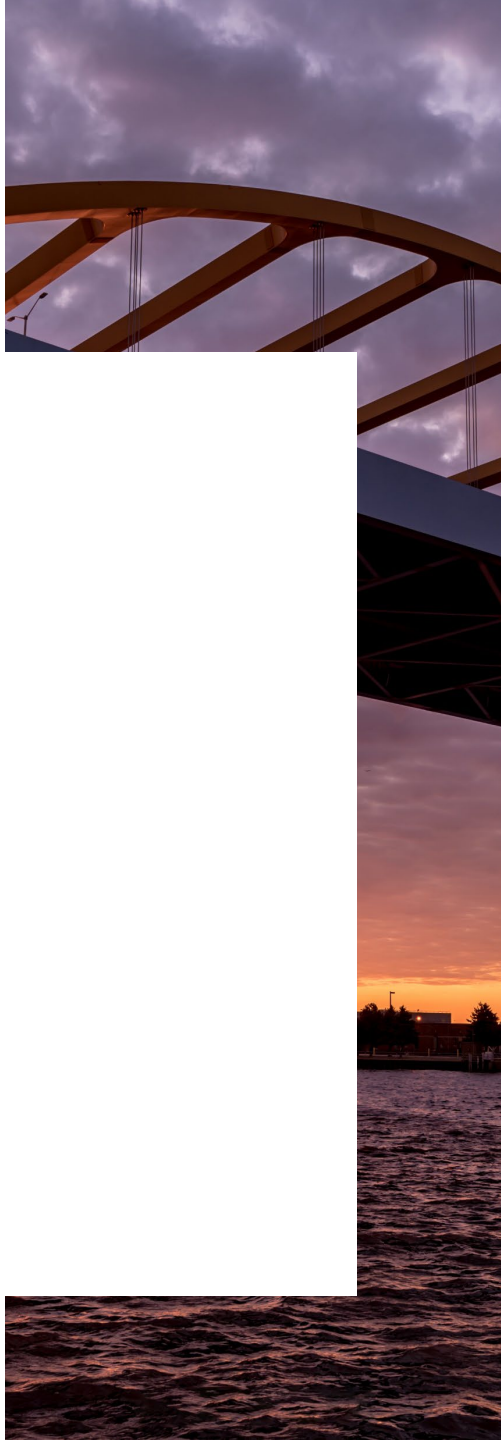


- Morgan used the schematics from Puerto 5 and builds the transaxle of claim 1 exactly as indicated in the schematic; does not alter the design
- Morgan chooses steel to construct the casing because steel is a common material used in the RC car industry to build transaxles and the company has a large supply of steel available
- Claim 2: “The transaxle of claim 1, wherein the casing is constructed from steel.”
- Is Morgan an inventor of Claim 2? **NO**
- The choice to use steel is not a significant contribution
  - Well known
  - Common in industry
  - No unique or unexpected benefit
  - In sum, no factor that would have made contribution significant when measured against full dimension of invention (Claims 1 + 2)

Scenario 3

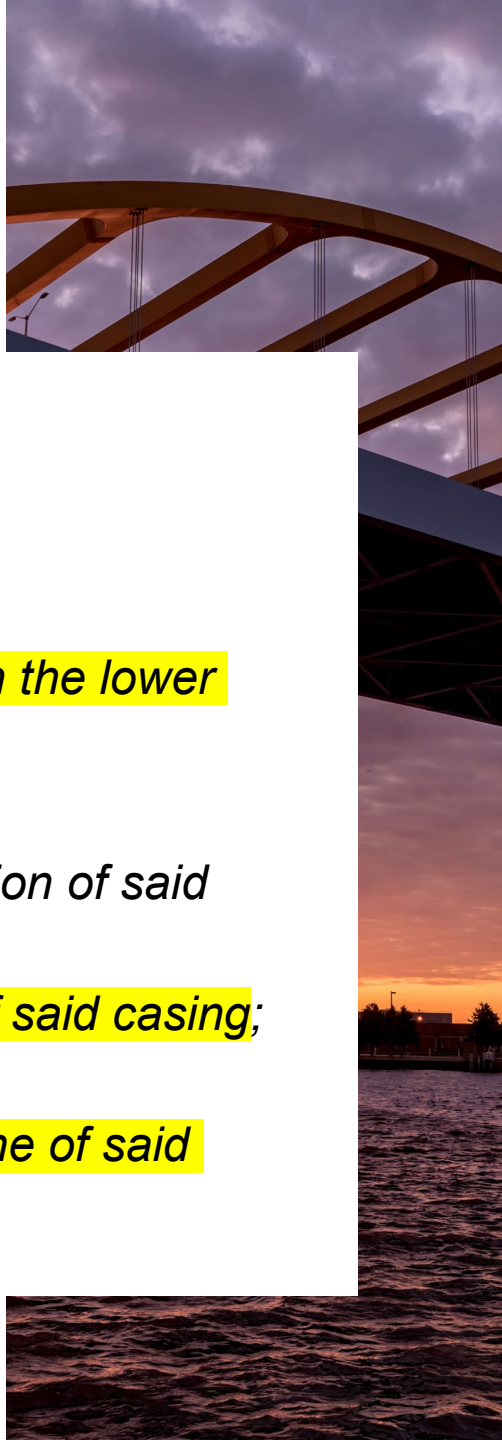
Use of AI System Does not Negate Human's Significant Contributions

- Ruth and Morgan further prompt Puerto5 to provide alternative transaxle designs
- Puerto5 outputs an alternative design – casing separable in horizontal plane
- Ruth and Morgan decide to build this design, but encounter challenges
- After significant experimentation, they develop design in which: (1) casing is elongated; (2) horizontal separation is in upper third of casing; and (3) axle shafts and transmission is in lower two thirds of casing
- Morgan further designs a clip fastener for removably attaching the transmission to the casing as opposed to using conventional fasteners



Scenario 3

Use of AI System Does not Negate Human's Significant Contributions



[Claim 3] A transaxle comprising:

an elongated casing;

a transmission;

said transmission being separate from said casing and removably mounted within the lower two thirds of said casing;

axle shafts extending from the lower two thirds of said casing;

said casing being defined by two separable casing elements wherein the separation of said casing elements is along a horizontal plane that is parallel to the axle shafts;

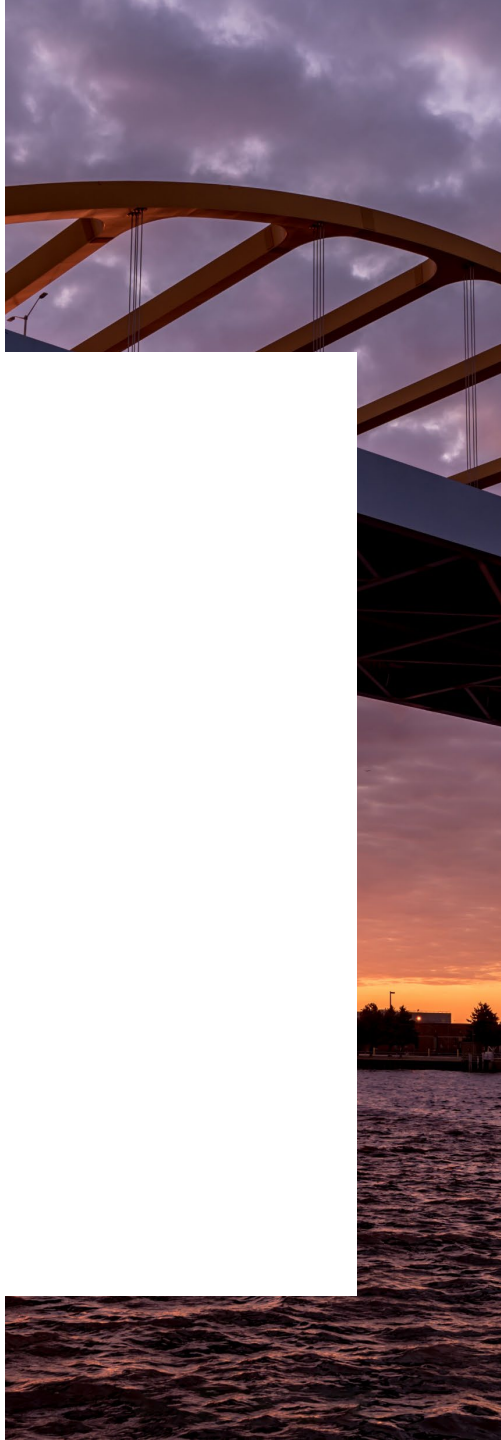
wherein said casing elements are separable at a location within the upper third of said casing; and

a clip fastener on said transmission that removably mounts the transmission to one of said separable casing elements.

Scenario 3

Use of AI System Does not Negate Human's Significant Contributions

- Are Ruth and Morgan inventors of Claim 3? **YES**
- Substantial experimentation that resulted in meaningful changes to the original design generated by the AI system
- Not simply the result of building/reducing to practice the AI-generated design
- Quality of contributions significant in view of full scope of invention – solved substantial problems with AI-generated design upon which Ruth and Morgan built
- Not merely explaining existing state of the art

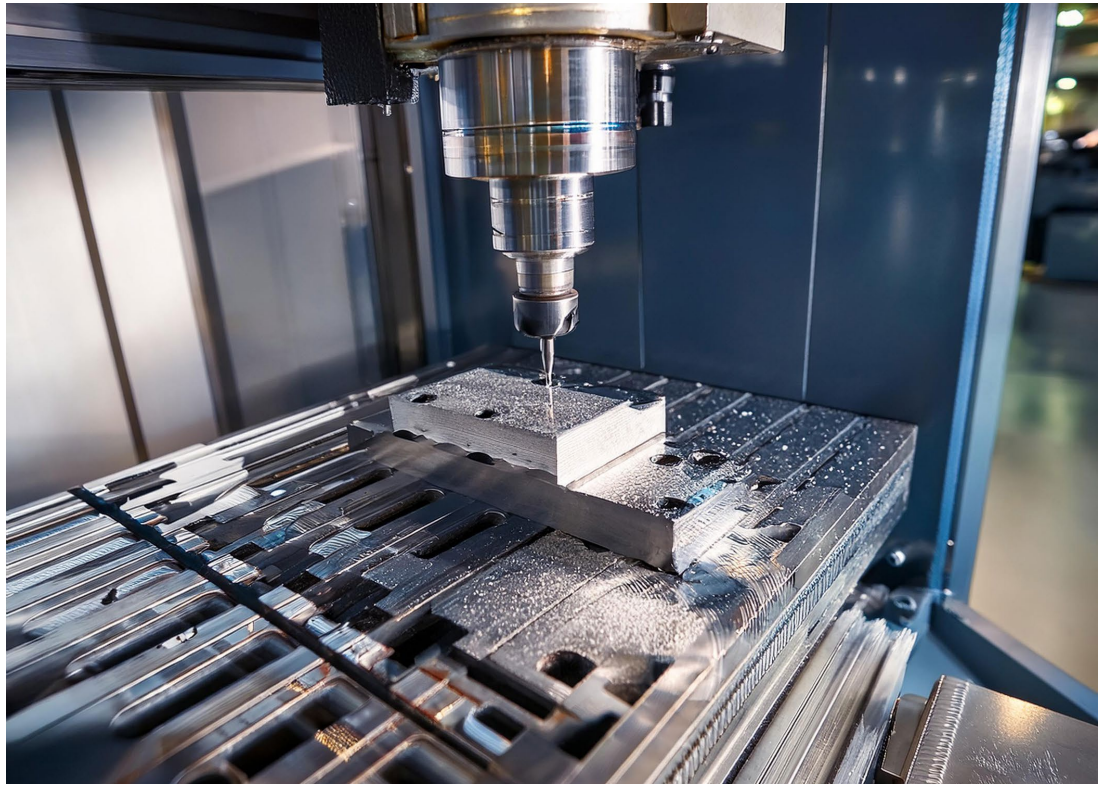


Scenario 4

Use of AI System Does not Negate Human's Significant Contributions

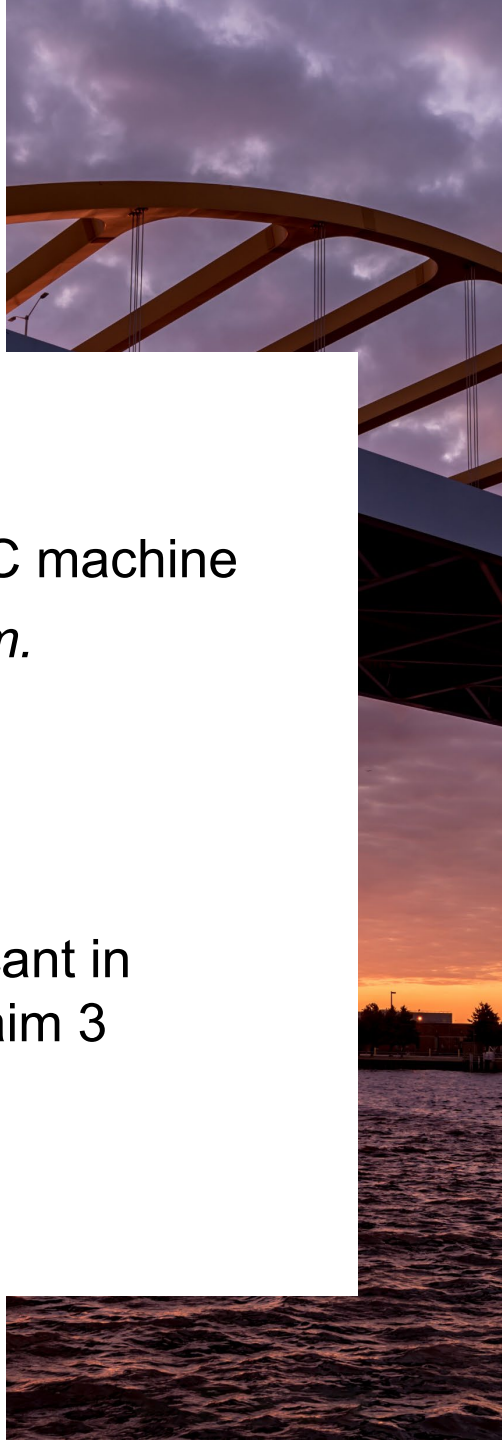
- Ruth and Morgan provided new design of Scenario 3 to Puerto5 and asked for manufacturing suggestions; Puerto5 suggested milling from aluminum with CNC machine

[Claim 4] The transaxle of claim 3, wherein the casing is made out of aluminum.



Scenario 4

Use of AI System Does not Negate Human's Significant Contributions



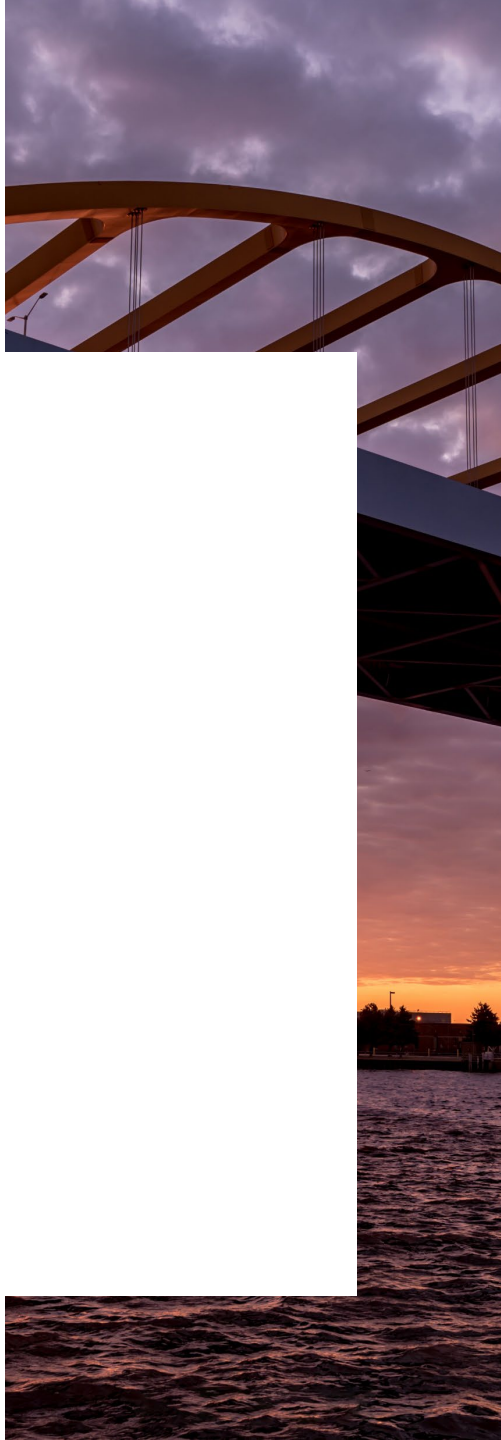
- Ruth and Morgan provided new design of Scenario 3 to Puerto5 and asked for manufacturing suggestions; Puerto5 suggested milling from aluminum with CNC machine

  [Claim 4] The transaxle of claim 3, wherein the casing is made out of aluminum.

- Are Ruth and Morgan inventors of Claim 4? **YES**
- Ruth and Morgan are inventors of the design reflected in Claim 3
- Puerto5 suggestion was conventional method and material
- Puerto5 contribution did not overshadow original design contribution – insignificant in view of full dimension of invention, including human contributions that led to Claim 3 design

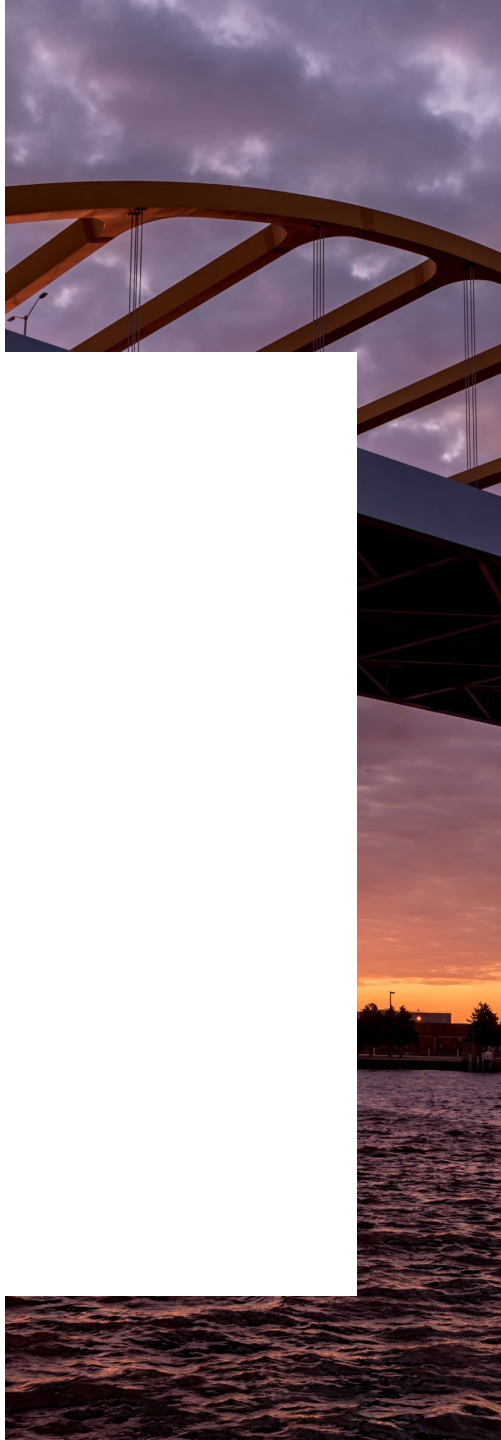
Practice Tips in View of Guidelines

- For all inventions, whether software or otherwise, utility application or design application, ask inventors whether AI models used to help come up with invention
- When the answer is yes, ask detailed questions about what the contributions of the humans and the AI model were:
  - Developing model?
  - Training model?
  - Fine-tuning general model for suitability to solve a particular problem?
  - Designing specific prompts to cause the model to generate suitable output?
  - Modifying output of model to solve problems with the initially generated output?



Practice Tips in View of Guidelines

- Carefully craft claims so that scope captures significant contributions to conception of at least one natural person
  - Dependent claims can capture contributions of AI model so long as they do not overshadow human contributions (consider quality of AI contributions relative to human contributions)
- Focus on guiding principles discussed above when weighing facts
- Where possible, advise technical teams to carefully consider and, where possible, limit AI assistance in development of key inventions where strong patent protection desired
  - Where AI assistance used, have clear understanding and documentation of significant human contributions to conception



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Questions?

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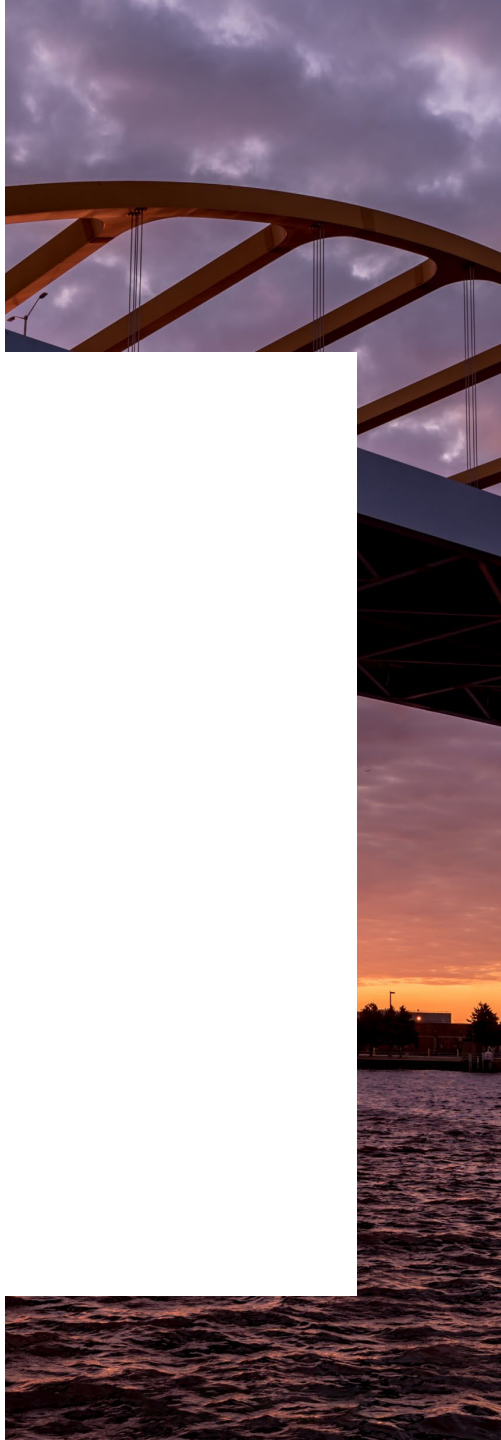

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