Considering EPO Framework and Developments in Computer Implemented Inventions and Navigating Patent Eligible Subject Matter for Computer Implemented Inventions under the USPTO Guidance: A Practical Discussion (October 2021 Revision)

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Contents

I. Introduction

A. *From Michael Piper*

To help understand the perspective of this discussion let me start with the fact that I am a patent prosecutor who works on patents for computer implemented inventions in the USPTO (and more specifically frequently in Art Unit 3600). While I spent time earlier in my career working on litigation matters in the district court and at the appellate level, the bulk of my career has been invested in developing disclosures, working with the inventors to build the stories that will become patent applications, and sharing the stories with Examiners in working to creatively define and protect the intellectual property developed by my clients. While my background starts with a mechanical engineering degree, time and circumstance (and some misspent youth writing basic programs on a Commodore 64) led to a large portion of my practice dealing with software and IT related inventions. As such, I watched that area of my practice develop significantly after State Street Bank and I have watched the Supreme Court and parts of the USPTO slowly bring it under increasing levels of scrutiny over the following years. I could say I have been on the front lines in prosecution in the USPTO as this particular pendulum has been swinging, but to set a metaphor it may be appropriate to suggest I was out at sea watching the storm roll up and have worked my way through the rough seas to what appears to be calmer (although still somewhat choppy) waters.

My goal with this discussion is to consider the best views I and my co-authors have at this particular moment in time responding to some of the fundamental questions of a patent prosecutor on both sides of the pond trying to gather their bearings in the calmer waters on the backside of this storm. Knowing the future still remains uncertain, how do I develop my disclosures to best prepare for what might be in store for me? What approaches can I take to try and protect my ability to draft claims as broadly as the state of the law will allow without implicating only abstract ideas? Or worse – what do I do with this case drafted years ago and now trapped in Art Unit 3600 being assessed under a set of standards or guidelines I did not perfectly anticipate when I drafted it?

This discussion is not an effort to divine the latest caselaw from every district court to determine every angle to attack or defend an issued patent at trial or on appeal. Rather it is a patent prosecutor's observations on how to most effectively work in the Office where the Examiners are much more likely to use the internal USPTO guidance than to interpret obscure caselaw. For this reason, and to address the questions about approach to disclosures and prosecution, we are trying to provide a practical discussion of the USPTO guidance and their examples to help navigate a sound path from disclosure development through application drafting to launch into choppy and potentially changeable seas. The discussion also adds in current experiences through regular interviews in the Office to the USPTO's most recent guidance to provide suggestions for prosecution for those applications already at sea in boats that were hopefully constructed well enough to hold up against the wind and waves of this lengthy storm.

I have the pleasure of updating my work with the inclusion of the excellent efforts of my decades long friend Mike Jennings with whom I have enjoyed many a morning at a coffee stop or evening in a pub commiserating or celebrating, but mostly exploring, our travels across these waters navigating between our offices efforts in this area. To share his work, we will lead off with an exploration of the current state of the law in the EPO where there have been interesting recent developments, then dig into the PTO guidelines and examples in depth

(which you may feel free to skip if you want to jump to the end of the story). We conclude with what are, interestingly, a fairly converged set of practice points which should help in both offices.

B. *From Mike Jennings*

European patent attorneys are in an enviable situation, especially those in the UK. We have a respected judiciary and two predictable local patent offices - the European Patent Office does its best to follow the principles set out by its Boards of Appeal and the UK Intellectual Property Office does its best to follow UK court precedents. Both patent offices publish helpful guidelines that reflect recent case law, and neither our local courts nor our patent offices surprise us very often - so we sleep well at night.

Despite this, rapid advances in technology and the EPO's unique assessment of patentability, clarity and added subject matter have thrown up just enough questions for us to receive flattering invitations to share updates with our US friends. It has been a privilege over the last decade to discuss patentability issues with Conley Rose President Michael Piper. Michael combines expert knowledge and vast experience with insightful strategic thinking and excellent problem solving skills. He also has an infectious enthusiasm for helping his clients and his friends. I am grateful to AIPLA for giving me a new excuse to work with Michael.

C. *Collectively - Progress towards a shared understanding 2018-2020*

In 2019, we believed we were witnessing a real opportunity, perhaps the best opportunity of our 30 year IP careers, for progress towards a consistent assessment of computer-implemented inventions in the US and Europe. We are returning to this two years later, to review recent progress. This paper summarizes some recent legal developments, compares current European and US practice and identifies what has changed, and reflects on best practice for European and US success.

When the USPTO added to its helpful published examples of patent eligible subject matter in January 2019, we could not help noticing their similarity to some examples we had seen in the case law of the EPO Boards of Appeal. USPTO guidance examples 38 (digital computer simulation of an analog audio mixer) and 39 (training a neural network for facial detection) aligned closely with EPO case law and patentability guidelines. This was closely followed by recommendations for reform of 35 USC 101 from the bi-partisan and bicameral US Senate Judiciary Subcommittee on IP, and these recommendations also seemed to adopt elements of the European approach. While this effort ran aground on the shoals of congressional disinterest, its framework lives on in new forms and provides an interesting study.

> **2019 Draft section 101 Patent Reform Framework**
> - Keep existing statutory categories of process, machine, manufacture, or composition of matter.
> - Define exclusive categories of statutory subject matter which should not be eligible for patent protection. E.g. fundamental scientific principles; products

> that exist solely and exclusively in nature; pure mathematical formulas; economic or commercial principles; mental activities.
> - Create a "practical application" test to ensure that the statutorily ineligible subject matter is construed narrowly.
> - Ensure that simply reciting generic technical language or generic functional language does not salvage an ineligible claim.
> - Replace judicially created exceptions to patent eligible subject matter with exclusive statutory categories of ineligible subject matter.

So there appeared to be both an appetite for US legislative reform and an openness to the possibility of increased global harmonisation of substantive patent law relating to computer-implemented inventions.

During 2017 and 2018, the EPO had been consulting on patenting developments in artificial intelligence and working on a substantive revision of its own patentability guidelines, reviewing 1000 of its own Board of Appeal decisions for computer-implemented inventions and distilling this down to some helpful guidance about the types of computer-implemented mathematical methods that were patentable.

Meanwhile, WIPO started a "conversation on AI and IP" in 2019 and the JPO added some AI examples to its Examination Handbook (and highlighted the requirement for an enabling disclosure - an important issue for AI cases). The USPTO added more examples in October that year and China's National IP Administration office also issued new guidelines (effective from 1 February 2020) that set out a similar approach to the EPO approach. In 2020, the High Court in Delhi focused on "technical effects" in its assessment of computer-implemented inventions.

With the IP5 offices working closely together in early 2020, and similar guidance being issued by patent offices around the world, it appeared that progress was being made towards a consistent response to AI patenting issues and computer-implemented inventions more generally.

We will look at some of these developments in more detail.

II.   *A Review of EPO Practices and Developments*

A. *Progress in Europe on AI Patentabilty 2018-2019*

The EPO explained that its Guidelines on mathematical methods are applicable to AI and machine learning (since this is based on computational models and algorithms for classification, clustering, regression, dimensionality reduction, etc). In its Guidelines for Examination G-II, 3.3, the EPO confirmed that a mathematical method may contribute to the technical character of an invention, i.e. contribute to producing a technical effect that serves a technical purpose, by its application to a field of technology and/or by being adapted to a specific technical implementation.

Note that this identifies two different ways in which a mathematical method can qualify for patent protection – "technical applications" and "technical implementations".

1.   Technical applications

The EPO listed numerous examples of technical purposes that contributed to patentability as "specific technical applications" of mathematical methods – see the list below. Claims to these applications are eligible for patent protection as long as the claims are functionally limited to the technical purpose. However, to qualify for a European patent, there

must be a sufficient link between the technical purpose and the mathematical method steps - for example by specifying in the claim how the input and output of a sequence of mathematical steps relate to the technical purpose - so that the mathematical method is causally linked to a technical effect.

The EPO Guidelines Part G-II, 3.3:
Technical applications
When assessing the contribution made by a mathematical method to the technical character of an invention, it must be taken into account whether the method, in the context of the invention, serves a **technical purpose**.

Examples of technical purposes which may be served by a mathematical method are:
- controlling a specific technical system or process, e.g. an X-ray apparatus or a steel cooling process;
- determining from measurements a required number of passes of a compaction machine to achieve a desired material density;
- digital audio, image or video enhancement or analysis, e.g. de-noising, detecting persons in a digital image, estimating the quality of a transmitted digital audio signal;
- separation of sources in speech signals; speech recognition, e.g. mapping a speech input to a text output;
- encoding data for reliable and/or efficient transmission or storage (and corresponding decoding), e.g. error-correction coding of data for transmission over a noisy channel, compression of audio, image, video or sensor data;
- encrypting/decrypting or signing electronic communications; generating keys in an RSA cryptographic system;
- optimising load distribution in a computer network;
- determining the energy expenditure of a subject by processing data obtained from physiological sensors; deriving the body temperature of a subject from data obtained from an ear temperature detector;
- providing a genotype estimate based on an analysis of DNA samples, as well as providing a confidence interval for this estimate so as to quantify its reliability;
- providing a medical diagnosis by an automated system processing physiological measurements;
- ~~simulating the behaviour of an adequately defined class of technical items, or specific technical processes, under technically relevant conditions (see G-II, 3.3.2)~~*

*The strikethough text above is because this last example which appears in the current EPO Guidelines is expected to be removed from the 2022 version.

2. Technical implementations

The EPO has also confirmed that claims to a specific technical implementation of a mathematical method can qualify for patent protection, where the mathematical method is adapted to the internal functioning of a computer system or network. This "adaptation" is where the design of the algorithm is motivated by technical considerations of the computer system that will perform the method – i.e. taking account of particular constraints or capabilities of the computer system. The EPO Guidelines give the example of adaptation of a polynomial reduction algorithm to exploit word-size shifts matched to the word size of the computer hardware.

3. Computational Efficiency

If a mathematical method produces a technical effect due to having been applied to a field of technology and/or adapted to a specific technical implementation, the computational efficiency of the steps affecting that established technical effect is taken into account when assessing inventive step. However, in the absence of a technical effect, algorithmic efficiency is not a sufficient condition for patentability.

B. *Developments in 2020 and 2021*

WIPO has recently broadened the scope of its "conversation on IP" to cover data protection issues and "frontier technologies" beyond AI, all of which are important but this broadening seems likely to slow WIPO's specific discussion of patent eligibility and sufficiency of description for AI innovations.

However, there is plenty of activity at a national level. The USPTO and UKIPO both recently consulted on AI patentability and each government expressed a desire to support investment in AI technologies in their respective country. We note that a number of US Senators have retained their enthusiasm for a review of US law on patent eligibility. We await the outcome of further consultations and the USPTO's recent "Patent Eligibility Jurisprudence Study", which sought public comments on how current jurisprudence has impacted investment and innovation in quantum computing, AI and healthcare-related technologies. These initiatives may lead to legislative change.

The USPTO's reference to innovation in quantum computing, AI and healthcare deserves a comment with reference to patentability in Europe. Recent applications of AI and other digital technologies in healthcare provide some excellent examples of "specific technical applications", as already reflected in the EPO's Guidelines. Even more recently, developments in quantum computing include algorithms designed to take account of the constraints of near-term intermediate-scale quantum (NISQ) hardware which should be allowable in Europe as "specific technical implementations" - e.g. algorithms designed for circuit depth reduction of gate-model quantum computers, or for quantum error detection and correction to deal with decoherence and noise to achieve fault-tolerance. Other examples include computer-implemented methods designed for a hybrid system combining quantum and classical devices, and methods designed to reduce operating noise within quantum devices (a technical effect similar to that of classical noise reduction filters). We suggest that the algorithms being designed to address the challenges of quantum computing hardware and hybrid networks include excellent examples of specific technical implementations of mathematical methods which should qualify for European patent protection.

Given the importance of quantum computing as an enabler for the most complex applications of AI, there is a strong commercial justification for national governments to ensure

that their legal systems stimulate investment in quantum computing as well as AI, and the EPO's acceptance of "specific technical implementations" should be noted by national patent offices.

One of the patentability questions that has received a lot of attention in the last two years is the question of whether the outputs of an AI system should be patentable in the absence of an identifiable human inventor. However, this paper will not include our opinion on AI inventorship nor specific recommendations for legislators. For now, we note that the USPTO, EPO and UKIPO and the UK courts have confirmed that current US and European law requires identification of a human inventor, and they have each recently rejected applications that identified an AI system as the sole inventor. Meanwhile, the South African Patent Office and Australian Federal Court both took a different view. No doubt the debate about AI inventorship will continue, but not within this paper.

Instead, we will focus on the developments that have a more immediate impact on patent drafting and prosecution practice, including some additional guidance that will soon be published.

1. Sufficiency of description in AI applications

In May 2020, the EPO Boards of Appeal provided a reminder of the perils of an insufficient description in case T161/18, by rejecting an application that claimed the use of a neural network to implement a known method for determining cardiac output by transformation of an arterial blood pressure curve measured at a peripheral region into the equivalent aortic pressure. The alleged inventive step was limited to the claimed use of an artificial neural network (the claim stated that "the transformation …is performed by the aid of an artificial neural network whose weighting values are determined by learning"). The EPO concluded that, in the absence of a sufficient description of how to carry out the training of the neural network, there was no inventive step in the claim's reference to use of a neural network and weighting values determined by learning.

This case should be taken as a reminder that a brief reference to a neural network or use of AI tools to carry out a known technique will not be enough to achieve patentability. The claims must include specific technical features. The case is also a reminder that a detailed description of how to implement an invention is essential for patenting success in Europe, as well as being best practice for success in the US. We will return to this point later.

2. Computer simulation and a review of the EPO's approach

In March 2021, the EPO's highest appeals authority, the Enlarged Board of Appeal (EBA), issued a reasoned decision on computer simulation. The decision of the EBA in case G1/19 has confirmed the EPO's long-standing general approach to the assessment of inventive step for computer-implemented inventions, while rejecting some earlier statements of principle for computer-implemented simulations. The decision in G1/19 also has significance beyond simulation, and has provided the EBA's first comments on computer-implemented inventions since referral case G3/08 in 2010. It deserves a closer look.

a. Significance of Computer Simulation case G1/19

The March 2021 decision provides answers to a set of questions on computer simulation that had been referred to the EBA in 2019 by one of the EPO's Technical Boards of Appeal. The EBA's answers are set out below. The referring Board had challenged the reasoning set out in an earlier decision T1227/05 (Infineon's simulation of a circuit that is subject to 1/f noise) which had been the leading EPO decision on computer simulation patentability for more than a decade. The referred questions had the potential to significantly change EPO practice.

EPO Enlarged Board of Appeal decisions are important, because they are followed by all EPO Examiners and Opposition Divisions in their first-instance proceedings and by the Technical Boards of Appeal (which handle the vast majority of appeals against the decisions of EPO Examining Divisions and Opposition Divisions). Furthermore, EBA decisions are typically accompanied by a detailed assessment of relevant EPO decisions and provide guidance on which cases and which principles should be applied in future.

The referral case G1/19 was significant because of the broad scope of the referred questions, and because the detailed guidance provided by the EBA included a review of the reasoning set out in previous EPO case law on computer simulation and more general comments on the EPO's approach to computer-implemented inventions. Both G3/08 in 2010 and G1/19 in 2021 told us which Board of Appeal decisions were approved by the EBA.

The specific case that was before the referring Board of Appeal in 2019 included some unusual claims relating specifically to a computer-implemented method of modelling pedestrian crowd movement. Some companies might question the relevance of such claims to their own businesses and this paper will not focus on the facts of this specific case, but the EBA's answers to the referred questions had the potential to change EPO practice beyond just simulations. In particular, the principles of the previous leading EPO simulation case T1227/05 had been influential in 2018 when the EPO rewrote its Guidelines on patentability of mathematical methods including machine learning and other AI, and its claims were remarkably similar to USPTO's Example 38 (digital computer simulation of an analog audio mixer). Therefore, a challenge to the reasoning in T1227/05 is significant.

So we need to consider how the EBA's decision in G1/19 might affect the EPO's future assessment of AI cases as well as simulation cases.

b.   Principles confirmed by EPO Enlarged Board of Appeal in G1/19

We should start by recognizing what did not change in 2021.

In its 2021 decision G1/19, the EPO EBA confirmed its well-established test for assessing inventive step of computer-implemented inventions (CIIs) that include a mix of technical and non-technical features. This was clearly set out in the EPO's 2002 Decision T641/00 (COMVIK) and includes an assessment of whether the claimed subject matter has "technical character" and produces "technical effects".

We often see the EPO's assessment of patentability of computer-implemented inventions referred to as a "two-hurdle" assessment, in which the first hurdle is a check of whether claimed subject matter is solely within one of a list of exclusions from patentability set out in Article 52(2) of the European Patent Convention (EPC). This hurdle can be cleared quite easily by careful claim drafting, because any claimed "technical means" is enough to get us over the hurdle – e.g. explicitly claiming a computer-implemented method or claiming a computer processor or a computer-readable storage.

The second hurdle is more difficult to clear, and involves the assessment of inventive step under Article 56 EPC. One reason why this is more difficult is that only features that contribute to the technical character of the invention can contribute to an inventive step.

The "two-hurdle" approach in practice involves three steps for assessing inventive step of computer-implemented inventions:

1.   assess whether a claimed invention is outside the patentability exclusions of Article 52(2) without referring to the prior art – e.g. a claim is outside the exclusions if it specifies computer-implementation;

2.   assess whether any of the claim features which differ from the closest prior art also contribute to the technical character of the invention, as only those features which contribute to technical character can be considered in relation to inventive step; and

3.   assess whether the claimed invention which includes those features involves an inventive step over the prior art.

Since all features which contribute to technical character must be considered when assessing inventive step, step 2 above has become important.

Although the three step approach set out above differentiate the EPO's approach from other patent offices, it is worth noting the Enlarged Board of Appeal's reminder that:

•   "European patents shall be available for any inventions, in all fields of technology, provided that they are new, involve an inventive step and are susceptible of industrial application" (i.e. not excluding any technical inventions, including those implemented in computer program code).

•   However, for European patent grant, the claimed subject matter must have a "technical character" and teach a skilled person how to solve a technical problem using technical means. The EBA noted that the list of categories of subject matter which European law regards as not being inventions "refer to activities which do not aim at any direct technical result but are rather of an abstract and intellectual character".

This established EPO approach is unchanged, and the requirement for something more than an abstract and intellectual idea is a concept that is very familiar to US attorneys, even though the USPTO's specific steps differ from the EPO's.

Next, we should look at what has changed.

In G1/19, the EPO told us that the established three-step approach to the assessment of inventive step should be applied to computer simulations, just as it is for other computer-implemented inventions. That is, if claims to a simulation invention include features that contribute to a technical solution to a technical problem, and which differentiate from the closest prior art, those features contribute to the "technical character" of the invention and must be considered when assessing inventive step. However, if the claim does not have any distinguishing features that contribute to a technical effect by solving a technical problem, there is no inventive step.

The EPO management team that is responsible for first instance decisions was very pleased to report that the outcome of the Enlarged Board of Appeal's review was a validation of their established "COMVIK approach", rather than a significant change of direction for assessing inventive step of computer-implemented inventions. However, this does not mean that nothing has changed.

Simulation of a technical system or process based on technical principles used to be considered as a technical purpose that qualified for patent protection if included as a functional limitation of the claim. This is no longer the case – we must now include other claim features that produce technical effects.

In relation to the specific simulation questions, the Enlarged Board of Appeal provided the following answers:

1. A computer-implemented simulation of a technical system or process that is claimed as such <u>can</u>, for the purpose of assessing inventive step, solve a technical problem by producing a technical effect going beyond the simulation's implementation on a computer.

2. For that assessment, it is <u>not</u> a sufficient condition that the simulation is based … on technical principles underlying the simulated system or process.

> 3. Answers 1 & 2 are no different if the computer-implemented simulation is claimed as part of a design process, in particular for verifying a design.

The first point suggests that many computer simulation claims will remain allowable after G1/19, but a technical effect is required. The mere fact that a claim relates to simulation of a technical system based on technical principles will not be enough.

Some simulation patents have avoided validity questions by including control of an apparatus or output of a control signal as an explicit feature of the claimed invention; but these are not the only options for patentability in computer simulation. The technical effects could also be provided by measurement of technical parameters as an input to a computer simulation. Both input measurements and output signals can be claimed as interactions with physical entities outside the computer. However, the EPO EBA confirmed that it does not see a need for "a direct link with physical reality" in every case, in the sense of causing a "technical effect on a physical entity in the real world". The technical effects could be within the computer system or network, and may only be achieved when the computer program is run on the computer system.

The EBA made the point that technical effects can occur in various different ways, either within a computer-implemented process and/or at the inputs and outputs of the process (such as receiving periodic measurement data, or continuously sending control signals to a technical system). Adaptations of a computer-implemented method to a computer or its operation, such as adaptation of data transfer or storage mechanisms for better use of storage capacity or communication bandwidth, can provide our justification for patent protection. This is consistent with but expands slightly on the EPO's Guidelines G-II, 3.3 discussing "technical implementations".

Helpfully, the EPO EBA referred us to 2019 decision T697/17 for a list of examples of earlier EPO Board of Appeal decisions in which adaptations to the internal functioning of a computer contributed to technical character and therefore could contribute to an inventive step.

These examples, in which technical effects occurred within a computer-implemented process, were:

Approved examples from T697/17, at reason 5.2.5:

- According to decisions T 650/13 and T 107/87, a compression algorithm contributes to the technical character of the claimed compression method if it is used for the purpose of reducing the amount of data to be stored or transmitted (T 650/13, reasons 6.3 and 6.4; T 107/87 of 26 April 1991, reasons 3).

- Decisions T 1003/09 and T 1965/11 considered that the cost-based optimisation of a query in a relational database system normally had technical character (T 1003/09 of 29 April 2015, reasons 13.3 to 13.5; T 1965/11 of 24 March 2017, reasons 5.1). In particular, decision T 1965/11 found that such a cost-based query optimisation searched for low-cost query execution plans using a cost estimate for the computer resources (such as CPU, main memory or hard disk) needed to execute a query plan, and therefore involved further technical considerations

> relating to the internal functioning of the computer system (T 1965/11, reasons 5.1 and 5.3).
>
> - Even though data structures used to store cognitive data are not considered to contribute to the technical character beyond the mere storage of data, data structures used for functional purposes are considered to contribute to producing a technical effect (see e.g. T 1194/97, OJ EPO 2000, 525, reasons 3.3 or T 424/03 of 23 February 2006, reasons 5.2).
>
> - In decision T 49/99 of 5 March 2002 the deciding board ruled that information modelling was a non-technical intellectual activity, but that the purposive use of information modelling in the context of a solution to a technical problem could contribute to the technical character of an invention (reasons 7). An object table used for storing "a system catalogue supporting the technical functions of the database system" had technical character (reasons 8 to 10).
>
> - In decision T 1351/04 of 18 April 2007, an index file used for the purpose of controlling the computer "along the path leading to the desired data" was considered to contribute to the solution of a technical problem (reasons 7.2).
>
> - In decision T 1902/10 of 21 June 2016, a RAM-based hash table of fingerprints of stored URLs was used, in the context of web crawling, to determine whether a URL already existed in a database of processed web pages. The hash table was considered part of the solution to the technical problem (reasons 19 to 22).
>
> - In decision T 2539/12 of 18 January 2018, search indexes used to provide access to stored data were considered to contribute to the technical character of the claimed method (reasons 5.5).
>
> - In decision T 2330/13 of 9 May 2018 the specific choice of the claimed bit strings and matrices and respective operations was considered to be determined by technical considerations concerning how to efficiently perform in parallel the steps of a method for evaluating selection conditions, and hence was considered to contribute to the technical character of the claimed invention (reasons 5.7.9 to 5.8).

These specific examples are helpful as guidance for the type of technical implementations that will qualify as a patent eligible computer-implemented inventions at the EPO. They not only help us to identify the threshold for patentability; because they have been approved by the EPO Enlarged Board of Appeal they also give us examples that can be cited to EPO Examiners and to Boards of Appeal when we argue in support of patentability.

Also, as well as helping us to understand which features will be useful in the independent claims of a European patent application, these examples and recent EPO case law also remind us of the benefits of including a detailed description of the inputs, outputs and internal processing of any computer-implemented invention. Since we typically do not know the closest prior art when drafting a patent specification, we cannot be certain which features

of our dependent claims or description we may need to rely on for our inventive step, but we do know that gaps in our description could be problematic.

We greatly increase our chances of European success by including a detailed description of the complete computer-implemented process, including measurements of technical parameters or selection of training data as inputs, as well as the process flows and data storage and communications, and outputs such as control signals. For inventions that require protection in Europe, we should explain in our patent applications how the claimed and described features contribute to the solution of technical problems. This detail will help us deal with the specific challenges of European patent prosecution – i.e. helping us to avoid the exclusions of Europe's Article 52(2), giving us explicit support for fallback amendments and arguments about technical effects and inventive step, and helping us to avoid the pitfalls associated with the EPO's strict practice on sufficiency, clarity/support and added matter.

This is true regardless of whether our clients' latest invention focusses on quantum computing, voice recognition, additive manufacturing or medical diagnosis.

Furthermore, the detailed description that is required for success at the EPO may also be valuable during US patent prosecution as is detailed in discussions of drafting recommendations below.

Most patent offices and courts require us, or at a minimum reward us, for telling our story about how an invention works, in exchange for a 20 year patent monopoly, and we predict that the consequences of non-compliance will be an increased number of EPO refusals. This is becoming increasingly clear for computer simulation and artificial intelligence technologies. Therefore, long before the world's patent offices and legislators achieve substantive patent law harmonisation, the patent profession needs to agree on international best practice for CII patent drafting.

C. *Recent USPTO Examples from an EPO perspective*

Although discussed in more detail later, we mentioned above the USPTO's examples of patent eligible claims that were published in January 2019 together with guidance on abstract ideas.

Example 39 considered this claim:

1. A computer-implemented method of training a neural network for facial detection comprising:

collecting a set of digital facial images from a database;

applying one or more transformations to each digital facial image including mirroring, rotating, smoothing, or contrast reduction to create a modified set of digital facial images;

creating a first training set comprising the collected set of digital facial images, the modified set of digital facial images, and a set of digital non-facial images;

training the neural network in a first stage using the first training set;

creating a second training set for a second stage of training comprising the first training set and digital non-facial images that are incorrectly detected as facial images after the first stage of training; and

training the neural network in a second stage using the second training set.

The guidance tells us that the claim recites limitations of applying transformations and training a neural network. The claim limitations are not merely abstract mathematical concepts; the claim recites a practical application. The claim does not appear relevant to any of the

abstract idea groupings of the 2019 Revised Guidance, so the claim does not recite a judicial exception and is eligible for US patent protection.

The EPO would have reached the same conclusion. Subject to the requirement for a sufficient disclosure of the invention and subject to the prior art, the EPO would accept that applying the transformations to create modified digital facial images for training the neural network for facial detection, and the use of the second training set for improved training, contribute to technical character and provide a patent eligible specific technical application of AI technology.

The EPO Guidelines G-II, 3.3.1 tell us that:
• "The classification of digital images, videos, audio or speech signals based on low-level features (e.g. edges or pixel attributes for images) are further typical technical applications of classification algorithms"
• "Where a classification method serves a technical purpose, the steps of generating the training set and training the classifier may also contribute to the technical character of the invention if they support achieving that technical purpose"

The EPO Guidelines G-II, 3.3 sets out examples of qualifying technical purposes including:
• "digital audio, image or video enhancement or analysis, e.g. de-noising, detecting persons in a digital image, estimating the quality of a transmitted digital audio signal"

USPTO Example 38 considered this claim:
1. A method for providing a digital computer simulation of an analog audio mixer comprising:

initializing a model of an analog circuit in the digital computer, said model including a location, initial value, and a manufacturing tolerance range for each of the circuit elements within the analog circuit;

generating a normally distributed first random value for each circuit element, using a pseudo random number generator, based on a respective initial value and manufacturing tolerance range; and

simulating a first digital representation of the analog circuit based on the first random value and the location of each circuit element within the analog circuit.

The guidance tells us that this claim recites limitations of initializing a model, generating a random value, and simulating a digital representation of the analog circuit. The claim limitations are not merely abstract mathematical concepts; the claim recites a practical application. The claim is not relevant to any of the abstract idea groupings of the 2019 Revised Guidance. So the claim does not recite a judicial exception and is eligible for US patent protection.

Prior to March 2021, it seemed very clear that the EPO would have reached the same conclusion. Example 38 seemed remarkably close to EPO appeal case T1227/05 which included claims to numerical simulation of an electronic circuit that is subject to 1/f noise and which had been cited many times as an example of a claim that was functionally limited to simulation of a technical item.

The assessment of European patentability now, following the EBA decision G1/19 in March 2021, depends on whether there are claim features that produce technical effects. Initializing a model of something technical does not produce a technical effect, and simulating a digital representation is no longer considered to be an adequately-defined technical purpose to achieve a technical effect. Therefore, US example 38 is closer to the threshold for European

patentability than it was before March 2021. If we were arguing in support of European patentability of a claim such as US example 38, we would focus on the generation of random values for each circuit element location, based on the manufacturing tolerance, and how this contributes to improved manufacturing. The patent specification's description of input circuit element locations and manufacturing tolerance ranges, the outputs such as control signals for use in manufacturing, and the data processing and technical effects, could each turn out to be critical when assessing patentability and comparing with the prior art.

We feel this provides a good summary of where we are and some key points of overlap between the EPO caselaw and the USPTO examples. We will now dig into the US side of the pond's perspective, while saving some last EPO comparisons, conclusions, and recommendations to the end.

III. A Quick Overview of The Last Guidance Developments in the PTO

A. The Impact of the Guidance: Immediate Improvement but Uncertain Future

In early 2019, the PTO released the Revised Subject Matter Eligibility Guidance and new Examples 37-42 illustrating the application of the Revised Guidance. This was followed by the release of an update to the Revised Guidance and further new Examples 43-46 in October 2019. The examples from the various Guidances are the focus of much of the discussion to follow. At its initial release, the guidance (and likely some underlying messages to the Examiners that came with them) had a remarkable effect at the Examiner level, especially in Technology Center 3600 where many examining groups seem to be almost abandoning 101 positions in favor of other pathways or allowance. This has since been retrenched in some art units within 3600 although most have still improved form the darkest days.

However, we have not seen similar results at the Board of Appeals. Instead, my group has seen a set of old appeal results from the Board arrive which almost universally applied lip service to the new guidance while upholding 101 rejections that in our current view would not have been made by the Examiners under the current guidance. In particular, the decisions cite and discuss the new guidance, but they do not actually apply the new guidance the way we are seeing the Examiners apply it. Instead, the Board in each of the decisions paints the limitations of the claims with a broad brush and then dismisses them as well-understood, routine, and conventional very much reminiscent of how the Examiners were applying 101 prior to the 2019 Revised SME Guidance. While Examiners are precluded under Step 2A, Second Prong from considering whether an element is well-understood, routine, and conventional, in some of the earlier decisions, the Board was not. We also note that in each of the decisions, the Board confirmed their finding of a recitation of an abstract idea at Step 2A, First Prong with citations to the specification that support their alleged category of abstract idea. At Step 2A, second prong, the Board in each of the decisions classifies almost all of the elements as abstract such that the only remaining elements in the claims that are not abstract are generic computer components recited at a high level of generality. The Board then tends to find that the additional elements merely apply the abstract idea using a computer and do not integrate the abstract idea into a practical application. At Step 2B, the Board in each of the decisions finds that

the claim elements recited are well-known, routine and conventional, and therefore there is no inventive concept.   It definitely feels like a push back from the Board which may embolden some Examiners to start toughening back up to some extent. We find the decisions from the Board alarming particularly in light of the 2019 Revised SME Guidance and the marked difference in how that guidance is being applied by most Examiners. A conservative answer at the moment would be to work harder to focus on a successful outcome with the Examiner rather than counting on help from the Board of Appeals at this time. As will be discussed in more detail below, we actually have had one bright spot in a positive decision from the PTAB overruling an Examiner in 3600 in a case we took back to the Board for a second time specifically tailoring the amendments and arguments to the new guidance. However, without more data this may be the outlier.   Given the decisions we have seen to date, we would suggest proceeding with caution when taking cases to appeal.

Further, while the courts seemed to be picking up on the messages and themes of the earlier guidance and bringing them more expressly into the caselaw – we have not seen quite the same traction with the more recent Guidance and some courts have chosen to expressly note they are not bound by the PTO. As our friends in the courts pick up the pieces of the PTO's lead that appeal to them, then we could get some caselaw building that would further bolster the gains that have been made, but the possibility still exists that the Federal Circuit (or ultimately the Supreme Court) could undercut the Director's efforts and throw us back into a maelstrom.

For these reasons, although things are currently much improved at the Examiner level in the PTO, the hard won lessons of the fight, including the robust disclosures and techniques we have been led to by the experiences working through it, remain important components to practice to be prepared for uncertain seas which lie ahead. What follows is our effort to develop and explain the basis and approach that we have concluded best prepares a ship to survive such storms.

IV.   Overview of USPTO Official Guidance

On December 16, 2014, the USPTO issued new interim guidance in light of *Alice Corp. v. CLS Bank Int'l.*, 134 S. Ct. 2347 (2014). Following feedback from patent stakeholders, the UPSTO issued Supplemental Guidance and Examples in July 2015. After Andrei Iancu was confirmed director of the USPTO in 2018, and in order to help provide more consistency during examination practice, the USPTO issued the 2019 Revised Subject Matter Eligibility Guidance (hereinafter "2019 Revised SME Guidance") on January 7, 2019. The 2019 Revised SME Guidance modifies step 2A of the USPTO's Subject Matter Eligibility Guidance as incorporated into the Manual of Patent Examining Procedure ("MPEP") 2106 by creating a revised Step 2A that includes a two-pronged eligibility analysis. This revised guidance supersedes MPEP 2106.04(II) along with any other sections of the MPEP that conflicts with the revised guidance as well as all versions of the USPTO's "Eligibility Quick Reference Sheet Identifying Abstract Ideas." The USPTO issued an update to the 2019 Revised SME Guidance in October of 2019 (hereinafter the "October 2019 Update"), which responds to public comments regarding the 2019 Revised SME Guidance and provides further explanation on how the USPTO applies such guidance. As of June of this year, all of the USPTO 101 guidance is now incorporated into the corresponding sections of chapter 2100 of the MPEP (i.e., §2106.06-§2106.07). The USPTO guidance has taken the form of documenting an overall approach and framework for

A. A Framework for Assessing Eligibility

The USPTO provided the following flowchart outlining initial considerations for determining patent eligibility including the revised Step 2A.

MPEP Flowchart   Revised Step 2A Flowchart
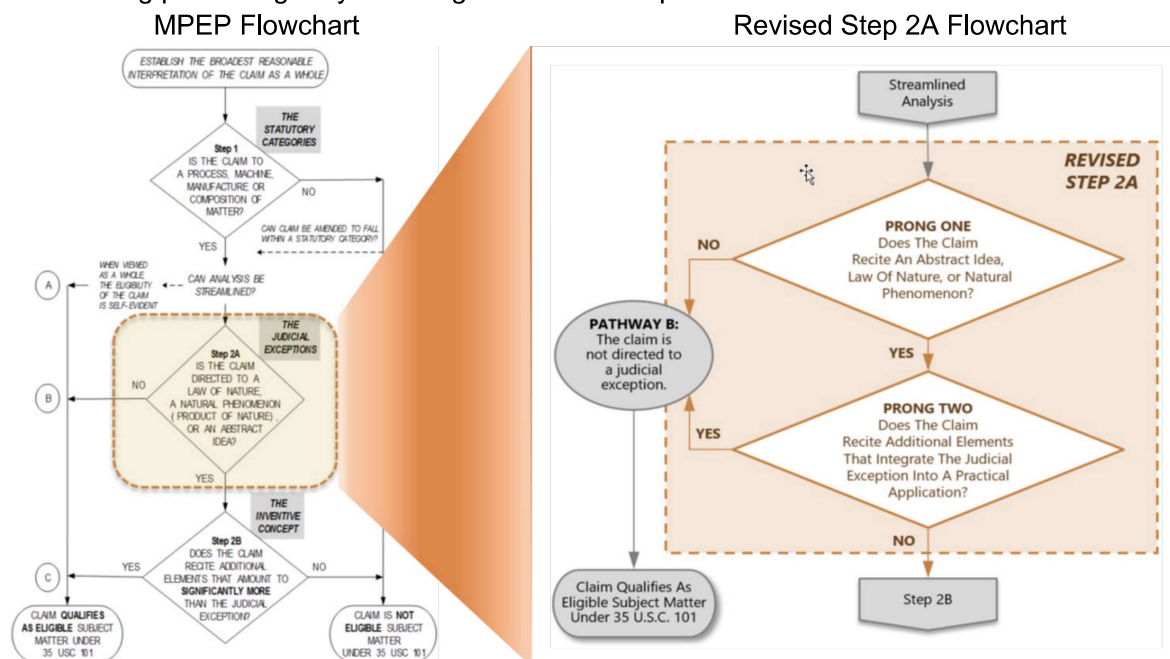
See 2019 Revised Patent Subject Matter Eligibility Guidance Advanced Module at slide 13, https://www.uspto.gov/sites/default/files/documents/2019peg_advanced_module_05mar2019.pptx.

The subject matter eligibility test is handled in two steps, with the second step having multiple parts. Step one asks whether the claim is directed to a process, machine, manufacture, or composition of matter. Computer-implemented methods are considered processes, and claims involving a non-transitory computer-readable medium are considered under the manufacture category. Examples of machines include a system as a collection of devices, such as a computer server with a computer store, or a mobile device with a server. Most claims can satisfy step one.

Once step one is satisfied, the USPTO moves to the first part of step two (called Step 2A), which concerns whether the claim as a whole is directed to a judicial exception. This is the step that was revised by the 2019 Revised SME Guidance to include two prongs. The first prong is similar to, but a variation on, former Step 2A of the Subject Matter Eligibility Guidance. Particularly, with respect to the abstract idea judicial exception, rather than determining at the first prong of Step 2A whether the claim is "directed to" a concept similar to those identified by the courts as abstract ideas, the claim is instead evaluated to determine whether it recites an abstract idea according to three categories of subject matter: (1) mathematical concepts,

including mathematical relationships, mathematical formulas or equations, mathematical calculations; (2) certain methods of organizing human activity, including fundamental economic principles or practices (i.e., hedging, insurance, mitigating risk); commercial or legal interactions (i.e., agreements in the form of contracts; legal obligations; advertising, marketing or sales activities or behaviors; business relations); managing personal behavior or relationships or interactions between people (i.e., social activities, teaching, and following rules or instructions); or (3) mental processes, including concepts performed in the human mind (i.e., an observation, evaluation, judgment, opinion). If an Examiner believes that a claim that does not recite subject matter from one of the above categories still should be treated as abstract, the Examiner must seek approval to issue a subject matter eligibility rejection from the Technology Center Director.

If the claim does not recite a judicial exception, the claim is not directed to a judicial exception and the eligibility analysis ends. If the claim recites a judicial exception, the claims are evaluated under the second prong of Step 2A. At the second prong of Step 2A, the claims are evaluated to determine whether they integrate a recited judicial exception into a practical application. Integrating the judicial exception into a practical application means that the claims apply, rely on, or use the judicial exception in a manner that imposes a meaningful limit on the judicial exception. The integration of the judicial exception must be more than a mere drafting effort designed to monopolize the judicial exception.

In determining whether the claim integrates the judicial exception into a practical application, Examiners are instructed to identify whether there are additional recited claim elements other than the judicial exception and determine whether those additional elements individually or in combination integrate the exception into a practical application. Some examples of considerations that are indicative of integration of the judicial exception into a practical application include an improvement in the functioning of a computer, or an improvement to other technology or technical field; effecting a particular treatment or prophylaxis for a disease or medical condition; implementing the judicial exception with, or using the judicial exception in conjunction with, a particular machine or manufacture that is integral to the claim; effecting a transformation or reduction of a particular article to a different state or thing; or applying or using the judicial exception in some other meaningful way beyond generally linking the use of the judicial exception to a particular technological environment, such that the claim as a whole is more than a drafting effort designed to monopolize the exception.

Notably, both the first and second prongs of the revised Step 2A specifically exclude any consideration of whether the additional elements represent well-understood, routine, conventional activity and further emphasize the need to evaluate a claim both as a whole and as individual elements. This is a key point as one of the primary pathways to rejection was the breaking up of a claim into small enough elements that the Examiner would then use their inherent knowledge (without proof) that each of the now reduced elements was well-understood, conventional, and routine. Taking this argument out of their hands in the Step 2A analysis should make life dramatically simpler. As in prior procedures, merely including instructions to implement an abstract idea on a computer or using a computer as a tool to perform the abstract idea, adding insignificant extra-solution activity to a judicial exception, or generally linking a judicial exception to a particular technological environment or field of use each do not constitute a practical application.

If the claim integrates the judicial exception into a practical application, the claim is not directed to a judicial exception and the eligibility analysis ends. However, if the claim does

not integrate the judicial exception into a practical application, the claim is directed to the judicial exception and the test moves on to the second part of step two (called Step 2B).

Step 2B was not changed by the 2019 Revised SME Guidance. Under this step, if the claims are directed to a judicial exception, such as an abstract idea, then examination continues with determining whether any element, or combination of elements, in the claim is sufficient to ensure that the claim amounts to *significantly more* than the abstract idea itself. Sometimes courts refer to "significantly more" as including an "inventive concept." To amount to significantly more, the claims must be more than mere instructions to apply the abstract idea. Under part two of the second step, the claims are to be considered both element-by-element, and *as a whole*. While this sounds promising in the abstract, in practice Examiners sometimes seem to overlook considering the claims as a "whole" in favor of a piecemeal analysis where each element in isolation is a known use of computers and abstracting any element that does not meet that test to the point where it can be set aside as an abstraction that is part of the judicial exception. As noted later in this discussion, the guidance and caselaw has provided some real support to put some weight back into the "as a whole" part of the argument noting that a new sequencing of known elements could provide the required significantly more. Further, Examiners can no longer summarily dismiss elements as well-understood, routine, and conventional without providing evidentiary support as a result of *Berkheimer v. HP Inc.* (Fed. Cir. 2018) and the resulting USPTO's guidance issued in the *Berkheimer* Memorandum. Evidence can be (1) an express statement by Applicant in the patent application or made during prosecution admitting the alleged well-understood, routine, and conventional nature of the claim elements; (2) a citation to a court decision finding the same claim element as well-understood, routine, and conventional; (3) a citation to a publication indicating the well-understood, routine, and conventional nature of the claim elements; or (4) a statement of official notice of the well-understood, routine, and conventional nature of the claim elements.

According to the USPTO, examples that are <u>not</u> significantly more include: adding instructions to apply the abstract idea; mere implementation on a computer (*Alice* – "using some unspecified, generic computer is not 'enough'"); having only a generic computer to perform generic computer functions; adding only "extrasolution" activity; and generally linking the exception to a technological environment or field. The USPTO also provides examples that may be significantly more: improvements to another technology or technical field; improvements to the functioning of the computer itself; applying a judicial exception with a particular machine; adding a specific limitation that is not routine or conventional; adding steps to confine the claims to a particular useful application; and other meaningful limitations. I have found it helpful with clients and in discussions with Examiners to contrast the analogous summary examples called out by the USPTO with my clients' claims. It is not enough to merely "link" the exception to a technological environment or field, but it is enough to "make improvements" to the technology or technical field. Similarly, merely implementing using some unspecified generic computer or adding instructions to simply "apply" the abstract idea is not enough; but improving the functioning of a computer or even applying the judicial exception with a "particular machine" can be enough. If after the last step of the analysis there is nothing that is significantly more, then the claim will not be patent eligible. Realistically, under the new guidance, the step 2B analysis is not providing a path to success very often. The factors which are defined to help in Step 2B are somewhat subsumed by the new elements of Steps 2A, while under Step 2B the Examiners are not blocked from arguing that the elements are conventional. There could still be some especially equitable stories that might sneak through

here – but the real battleground seems to have moved to the much more makeable hurdle in Step 2A.

The USPTO has also suggested a "streamlined analysis" to more quickly analyze for patent subject matter eligibility. The 2019 Revised SME Guidance does not change the streamlined analysis, which is discussed in MPEP 2106.06. Examiners may continue to use a streamlined analysis (Pathway A in the above flowchart) when the patent eligibility of a claim is self-evident. Effectively this analysis goes back to Step 2A and assesses whether a patent application "directed to a judicial exception" is really directed to the exception. Per the USPTO, when a claim contains a judicial exception, but does not attempt to tie up the exception, then it is eligible. Examples of "clearly" eligible subject matter under this approach highlighted by the USPTO in various places include: a robotic arm having a control system using mathematical formulas; an artificial hip coated with a naturally occurring mineral; and (by way of one of the examples) an engine having a computerized control system. As a practical matter, the Streamlined Analysis has been subsumed by the new standard for Step 2A which applies much of the same thinking to limit how broadly "directed to" encompasses with respect to whether the claims are "directed to" an abstract idea. However, as a technical matter, we confirmed that the most current flow-chart (post new Guidance) includes the streamlined analysis and the new guidance itself notes that it does not change the streamlined analysis, thereby indicating that the streamlined analysis still exists as an option for consideration. We have not seen it expressly applied since the new guidance came out.

In what should not be overlooked as a significant positive decision made by the USPTO at the very beginning of the rise of 101 challenges, the USPTO made very clear in its guidance and its actions that the claims will be examined for other requirements even if a patentable subject matter rejection under section 101 is made. For example, the claims will be examined for: enablement and written description (35 U.S.C. § 112), novelty (35 U.S.C. § 102), obviousness (35 U.S.C. § 103), double-patenting, etc. I shudder to think of the damage and challenge if the Office had taken an administrative expedient of deciding not to "waste" resources examining claims that were not eligible under 101. Many potential 101 challenges have been able to be set aside because of art found by the Examiners or legitimate 112 issues they identified that allowed applicants to make a decision to let a case go for compelling other reasons rather than push the issue on 101 only to find years down the road that there were other significant challenges to the application in question.

B. The Examples of Eligible and Ineligible Claims

Along with the formal eligibility guidance, the USPTO also issued Abstract Idea examples with sample claims and reasoning as to why the USPTO would or would not find the claim eligible. The most relevant Abstract Idea examples today are examples 37-42, which illustrate the application of the 2019 Revised SME Guidance. The following is a synopsis for a selection of some of the earlier, more notable examples from the USPTO as well as the newest examples.

Given that at the time the guidance were first released there were few if any examples of positive caselaw – the examples and their explanations have been very useful tools. In their absence it was fairly simple to work to distinguish yourself from the claims in a case that had a negative result, but because the cases were generally about pretty extreme examples, it was more difficult to say how far apart from the negative cases one had to be to cross over the line to safety. For all the perceived flaws or shortcomings of how the claims were tweaked or how the Office worked them over to fit the guidance, having positive and negative examples

and explanations of how to navigate between them has at least provided a framework for constructive discussion with the Examiners which for most art units has been incredibly useful.

Even in the 3600's, where my practice group has had some of our greatest challenges on finding a path through 101, I would note the following contrasting discussions with Examiners during in-person interviews as illustrative of this point. On the negative side, I have had a Primary Examiner inform me in an in-person interview that the guidance was not in fact binding or persuasive and he was more than capable of reading and interpreting the caselaw on his own and suggesting that my efforts to rely on the guidance for discussion were not productive. I have told this story to almost every other Examiner I have worked with in 3600 (and elsewhere) and they were varying levels of shocked and stunned and distanced themselves from such a position. In contrast, I have had more than one in-person interview (even with some "difficult" Examiners) where the discussion started with the Examiner dropping a copy of the guidance on the table and beginning the discussion with – "I think your claims look like this example," leading to an engagement on the elements comparing two similar positive and negative examples in an effort to properly categorize the claim or amend the claim to more clearly categorize it. I firmly believe the opportunity to have that as a structured discussion provides a much better opportunity for a successful negotiation or even a better set up for a successful appeal than what we experienced prior to the emergence of the guidance.

1. The Old Supreme Court Case Examples

Not surprisingly, the USPTO made sure to pull out our "best" and "worst" Supreme Court cases and turn them into examples to work with. Let's start with the example based on the older case. Example 24 of the USPTO Abstract Idea Examples is based on *Parker v. Flook*, 437 U.S. 584 (1978). The claim recites:

> 1. A method for updating the value of at least one alarm limit on at least one process variable involved in a process comprising the catalytic chemical conversion of hydrocarbons wherein said alarm limit has a current value of $B0+K$ wherein $B0$ is the current alarm base and K is a predetermined alarm offset which comprises:
>
> (1) Determining the present value of said process variable, said present value being defined as PVL;
>
> (2) Determining a new alarm base B1, using the following equation: $B1= B0(1.0-F) + PVL(F)$ where F is a predetermined number greater than zero and less than 1.0;
>
> (3) Determining an updated alarm limit which is defined as $B1+K$; and thereafter
>
> (4) Adjusting said alarm limit to said updated alarm limit value.

Let's walk through the claim briefly. Please look for the express use of a computer in any form as contrasted with a really experienced technician armed with a pencil and a piece of paper running the system. Considering the alarm itself – it is an alarm to do what? We do not even have the alarm take or result in any action – we just update it. My shorthand for this type of claim is a thinking of a number claim. I am thinking of a number. I am manipulating the number and as a result I have a new number. I do not do anything with the number. In this instance the number is not even necessarily on a computer which could take action based on the number. If there is an action to take – the claim does not even help me understand what it might be. So, at least as interpreted into claim form by the USPTO, this set of claims

is disconnected from just about everything and also potentially results in thought control of my pencil wielding tech. The result from there is pretty straightforward.

The USPTO provided analysis for this sample claim with the following reasoning. First, the claim recites a mathematical formula, and then the Office stated that this is an abstract idea. The reasoning also stated that the claim is not limited to performing the method on a computer because it could be done with pen and paper. The field of use recited in the preamble is non-limiting and therefore none of the steps amount to more than an exception. The claims only recite the use of math and the adjusting of the alarm is post-solution activity. Therefore, the USPTO reasoned that this claim is not eligible for patentable subject matter. However, had the claim included detecting an alarm and shutting down a process, it may have been close to *Diamond v. Diehr*, which was shown to have eligible subject matter. Here, the mathematical formula, no express computer in the claim, and an alarm limit with no defined effect, seemed to cut against the decision for patent eligibility. However, an alarm that shuts down the process may have been sufficient because it would be making a concrete change in another product, which could be argued integrates the abstract idea into a practical application.

The *Diamond v. Diehr* case is, for many of us I assume, one of our favorite cases in this space. It is so important the USPTO built one of its initial examples in the initial guidance based on *Diamond v. Diehr* and then came back and built a second example around it. The background for *Diamond v. Diehr* is one I frequently use with my inventors when explaining subject matter eligibility and elements which will help put us on stronger footing against future potential 101 challenges to an application we are working on. At the end of the day, *Diamond v. Diehr* is really a case about making tires. We need to vulcanize the rubber appropriately and try to hit the sweet spot to obtain the desired characteristics. The case uses a computer working with sensors in the tire press to watch temperatures during heating and release the heat at a preferred moment in time to desirably cure the rubber. It absolutely uses a computer applying a known formula (abstract idea) but in this instance it proceeds through implementation to actually make the tire (the essence of a physical result). So my short hand for my inventors is that if we can make sure we are applying their innovative program or computer implemented process to accomplish a physical result – we are "making tires" and we are much more likely to be ok.

In Example 25, which is based on *Diamond v. Diehr*, 450 U.S. 175 (1981), these are the claims as interpreted by the USPTO for this example:

1. A method of operating a rubber-molding press for precision molded compounds with the aid of a digital computer, comprising:
providing said computer with a data base for said press including at least, natural logarithm conversion data (ln), the activation energy constant (C) unique to each batch of said compound being molded, and a constant (x) dependent upon the geometry of the particular mold of the press,
initiating an interval timer in said computer upon the closure of the press for monitoring the elapsed time of said closure,
constantly determining the temperature (Z) of the mold at a location closely adjacent to the mold cavity in the press during molding,
constantly providing the computer with the temperature (Z),

repetitively calculating in the computer, at frequent intervals during each cure, the Arrhenius equation for reaction time during the cure, which is ln v = CZ+x, where v is the total required cure time,

repetitively comparing in the computer at said frequent intervals during the cure each said calculation of the total required cure time calculated with the Arrhenius equation and said elapsed time, and

opening the press automatically when a said comparison indicates equivalence.

This is very similar to the second claim in this example that is also eligible.

The USPTO reasoned that this claim was eligible, but to get there, it first stated that the claim recites a mathematical formula, which is an abstract idea. Some of the additional steps were asserted to be "routine or generic computer functions", yet when considered as a whole, the claim recites more than the abstract idea. Specifically, the claim as a whole was reasoned to add meaningful limits on the use of the equation. The steps are an improvement to the technical field, and therefore were considered to be patent eligible subject matter. The form of the claim as a method or a non-transitory computer readable medium does not change the analysis, and therefore both forms would be eligible for patentability.

The USPTO reasoning is also enlightening here on several fronts. First they point out that the claim adds reasonable limits to the use of the formula, this echoes the concerns about pre-emption of an entire abstract space. They also point out that it reflects an improvement to the technical field. In making this note however, observe that the claims themselves do not expressly address the improvement to the field. In fact, it is even difficult to tell they are making tires if you do not have the appropriate background context from the specification or knowledge of the field. Rather, it is the specification that makes clear how the impact of the claimed elements results in improvements. For what is the first of a continuing sequence in the examples, the story from the specification is used by the USPTO to help justify eligibility under 101. Finally, the USPTO guidance in this example notes that the analysis will be the same regardless of the form of the claim. The USPTO is trying to successfully establish that the form of the claim should be independent of the 101 analysis. So whether it is in the form of executable code on a medium, or method using a computer, or a computer system with a processor configured to implement a method, the USPTO is suggesting the choice of form should not define the 101 analysis but should be independent of it. If successful, this push by the USPTO could be a strong benefit to our flexibility in crafting claims to best capture the correct infringers.

2. The Pre 2019 Revised SME Guidance Positive Examples

In the earlier, pre 2019 Revised SME Guidance, the Office primarily worked to find existing caselaw to carve up to make its examples. One of the earlier examples based on actual caselaw (*DDR Holdings* (Fed. Cir. 2014) and used to demonstrate eligibility is Example 2 from the initial guidance. The example claim recites:

19. A system useful in an outsource provider serving web pages offering commercial opportunities, the system comprising:

(a) a computer store containing data, for each of a plurality of first web pages, defining a plurality of visually perceptible elements, which visually perceptible elements correspond to the plurality of first web pages;

(i) wherein each of the first web pages belongs to one of a plurality of web page owners;

(ii) wherein each of the first web pages displays at least one active link associated with a commerce object associated with a buying opportunity of a selected one of a plurality of merchants; and

(iii) wherein the selected merchant, the outsource provider, and the owner of the first web page displaying the associated link are each third parties with respect to one other;

(b) a computer server at the outsource provider, which computer server is coupled to the computer store and programmed to:

(i) receive from the web browser of a computer user a signal indicating activation of one of the links displayed by one of the first web pages;

(ii) automatically identify as the source page the one of the first web pages on which the link has been activated;

(iii) in response to identification of the source page, automatically retrieve the stored data corresponding to the source page; and

(iv) using the data retrieved, automatically generate and transmit to the web browser a second web page that displays: (A) information associated with the commerce object associated with the link that has been activated, and (B) the plurality of visually perceptible elements visually corresponding to the source page.

In this claim, there is the aspect of two computers expressly interacting back and forth and having impacts on other devices (although the other devices running the user web browsers are not an express element), which has been identified by some Examiners as a useful pathway, but there are no real physically manifested inputs or outputs in the claims – just moving data around between computers. However, according to the USPTO analysis, the claim does not recite an exception because the claim is necessarily rooted in computer technology to address a problem arising in computer networks. Per the USPTO, the claim is not a generic use of a computer, but instead recites a specific way to automate the creation of a web page by an outsource provider using multiple sources to solve a web site specific problem on the internet. Again, the problem itself being solved and the explanation of how the claimed elements solve that problem are not provided expressly in the claims, but rather are drawn from the story told in the specification. And yet the USPTO uses the story to justify how this is a solution necessarily rooted in computer technology and thus not an abstract idea. We are learning from the USPTO that using the description and claims to define the claim as being rooted in computer technology is important. The description should clearly state how the problem arose within the computer realm and how it is being solved using the computer (a computer solution to a computer problem).

Another USPTO example demonstrating patent subject matter eligibility for discussion here is Example 3, based on *Research Corp. Tech.* (Fed. Cir. 2010). The example claim recites:

1. A computer-implemented method for halftoning a gray scale image, comprising the steps of:

generating, with a processor, a blue noise mask by encoding changes in pixel values across a plurality of blue noise filtered dot profiles at varying gray levels;

storing the blue noise mask in a first memory location;

receiving a gray scale image and storing the gray scale image in a second memory location;

comparing, with a processor on a pixel-by-pixel basis, each pixel of the gray scale image to a threshold number in the corresponding position of the blue noise mask to produce a binary image array; and

converting the binary image array to a halftoned image.

This example provides an interesting contrast to an image example which we will discuss later. It also continues the chain of the USPTO guidance, relying on stories from the specification to support eligibility of the claims. The USPTO stated that the generation of the blue noise mask is an iterative mathematical operation, and therefore asserted that the claim is directed to an abstract idea. Without support, the reasoning also asserted that the storing and receiving steps are generic computer functions that do not add significantly more. Note that an analysis of what is "generic" seems to be an analysis of what is known or commonplace, which should normally be relegated to an obviousness or novelty analysis instead of a test for patent subject matter eligibility, but nevertheless is a recurring theme with Examiners in discussions on eligibility of computer implemented claims. Irrespective of this caveat, the USPTO observed that tying the mathematics and the "generic" computer functions to the production of a specific type of image was important in the given analysis for patentability. One will note that this can be argued to be a product or output of the computer process – so something akin to a hard output rather than simply moving numbers around in a vacuum. According to the USPTO, the comparing and converting steps tie the mathematical operation to the processor and add significantly more. The USPTO specifically points out that this claim reflects an improvement to the computer itself by providing benefits such as less memory usage, faster calculations, and better images. I suggest again that a review of the claim shows no sign of any expression of these benefits, so again the story in the specification is helping to carry the day. As a result, this ends up being an example of having "enough" detail in the specification to help define the claim as something more and to better bring it into a category of a claim which improves the functioning of the computer itself.

USPTO Example 33, which is based on *Bascom Global Internet v. AT&T Mobility LLC* (Fed. Cir. June 2016), conveys the message from that case that the claim should be considered element by element <u>and as a whole.</u> The example claim recites:

1. A content filtering system for filtering content retrieved from an Internet computer network by individual controlled access network accounts, said filtering system comprising:
 a local client computer generating network access requests for said individual controlled access network accounts;
 at least one filtering scheme;
 a plurality of sets of logical filtering elements; and
 a remote ISP server coupled to said client computer and said Internet computer network, said ISP server associating each said network account to at least one filtering scheme and at least one set of filtering elements, said ISP server further receiving said network access requests from said client computer and executing said associated filtering scheme utilizing said associated set of logical filtering elements.

In this example, consistent with the Federal Circuit, the USPTO indicated that the claims were directed to the abstract idea of filtering content, which is a well-known method of

organizing human behavior. They then further observed that the claim limitations, taken individually, recite generic computer elements. However, unlike some Examiners in the past, the analysis did not stop there. The Federal Circuit went on to decide that collectively, the inventive concept (the "significantly more") was found in the non-conventional and non-generic arrangement of known, conventional pieces. To reach this conclusion, the USPTO noted that the Federal Circuit focused on the recitation of a practical application of the claim finding that the claim recited a "technology-based solution" of filtering content on the Internet that overcame disadvantages of prior art filtering systems. While filtering content was known, making the filter applicable to each user's preference while installed remotely in a single location was not known. This was demonstrated by noting the change in functionality obtained by the claimed system.

3. The Pre 2019 Revised SME Guidance Negative Examples

There is no better place to start in this section than the case which has ended up crystallizing the concerns about computer-implemented inventions. Note this has occurred on a case which on its face also has some positive things to say and does not necessarily demand the somewhat draconian implementation that some of the district courts have adopted in its name. The Supreme Court stated in *Alice* that computer-implemented inventions are patentable, and the Court did not explicitly state that software related inventions are ineligible for patentability. In converting *Alice* into its example, the USPTO Guidance version of the *Alice* claim recites:

> 33. A method of exchanging obligations as between parties, each party holding a credit record and a debit record with an exchange institution, the credit records and debit records for exchange of predetermined obligations, the method comprising the steps of:
> (a) creating a shadow credit record and a shadow debit record for each stakeholder party to be held independently by a supervisory institution from the exchange institutions;
> (b) obtaining from each exchange institution a start-of-day balance for each shadow credit record and shadow debit record;
> (c) for every transaction resulting in an exchange obligation, the supervisory institution adjusting each respective party's shadow credit record or shadow debit record, allowing only these transactions that do not result in the value of the shadow debit record being less than the value of the shadow credit record at any time, each said adjustment taking place in chronological order; and
> (d) at the end-of-day, the supervisory institution instructing ones of the exchange institutions to exchange credits or debits to the credit record and debit record of the respective parties in accordance with the adjustments of the said permitted transactions, the credits and debits being irrevocable, time invariant obligations placed on the exchange institutions.

Looking through the claim as illustrated by the USPTO, there is not even a computer called out expressly in this claim. As crafted here, the claim could in fact be carried out by our apocryphal man with a pencil and paper. As the USPTO observes, when the claim is directed to managing settlement risk through an intermediary, this was deemed to be a method of organizing human activity (MOHA) and a fundamental practice long prevalent in our system of commerce. The USPTO also specifically notes that the computer only performs generic

functions which can be performed entirely in the mind of a human. Use of an unspecified, generic computer to perform steps that can be completed entirely in the mind of a human does not transform an abstract idea into a patent-eligible invention. Even though the system claim finally expressly includes a computer – it is not engaged in the problem and solution but rather a simple add on (i.e by/on a computer) and hence the USPTO tells us the system claim fails for the same reason. In the absence of hard inputs or hard outputs, in the absence of real engagement of the computer in the process – there was simply not much available to hang your hat on for eligibility under the current standards. Like most of the claims in the negative side of the equation – the discussion is not particularly challenging as they have little to no arguments that they meet the standard. What we need is a case that is much closer to the boundary with a positive outcome to help more definitively support the view of how much is "enough."

Example 5 from the guidance is our other imaging example, this time on the negative side of the equation. It is based on *Digitech Image Tech*. (Fed. Cir. 2014). The claim as the USPTO interpreted it recites:

A method of generating a device profile that describes properties of a device in a digital image reproduction system for capturing, transforming or rendering an image, said method comprising:
   generating first data for describing a device dependent transformation of color information content of the image to a device independent color space through use of measured chromatic stimuli and device response characteristic functions;
   generating second data for describing a device dependent transformation of spatial information content of the image in said device independent color space through use of spatial stimuli and device response characteristic functions; and
   combining said first and second data into the device profile.

Calling back to a previous discussion, this claim gets back to the "I am thinking of a number problem." The claim generates a profile (a set of numbers). It does so by generating a first set of numbers, generating a second set of numbers, and combining the two numbers. Absent a clearly defined improvement to the functioning of a computer enabling it to do so, it is going to be difficult to impossible to protect a method of generating a number which is all this invention is claimed to be. The claim is more startling by what it lacks in the current framework. It does not include the hard devices taking measurements, it does not include the devices being measured, it does not even include the application of the profile to generate a transformed image, much less elements of the process for transforming an image. The USPTO asserted that this claim was ineligible because all steps were addressing gathering and combining data and manipulating data using mathematical relationships – abstract ideas. The Federal Circuit seemed to point the way by stating that simply reciting data being manipulated will not be enough. The Federal Circuit specifically observed that the claim "does not require input from a physical device." It further observes that there is no limit to the use of the device profile, and there are no additional elements beyond the abstract idea. In the context of the time of drafting, it is understandable that a claim divorced from any of its hardware could have advantages in a suit for infringement, trying to target the correct defendant and avoiding potential issues of divided infringement. But given where the law is drifting – a much more compelling argument could have been crafted if the method had been properly tied to the image processor or to field of use components (e.g., an image processor,

a camera, an output device such as a printer, monitor, etc.), or potentially even to memory storage structures. Similarly we are left to wonder how the Court might have handled it if the claims had been more about how the devices were accomplishing these results rather than simply how, at a pretty abstract level, the numbers were generated.

We have grouped together USPTO Abstract Idea Examples 7 & 8 based on the *Ultramercial* & *BuySafe* cases from the Federal Circuit. In *Ultramercial*, the overall process is characterized as using advertisement as currency, and thus asserted to be a fundamental economic practice or abstract idea. In *Buysafe*, the overall process was characterized as creating a contract, another fundamental economic practice. When the only remaining limitations are characterized as generic computer functions, the claims will be ineligible. We collect these two together as illustrative of a theme we also see replicated within the art units within the Office. We discuss the elements which may provide assistance as hard inputs, hard outputs, and computer solutions for computer problems. At the end of the day – if your hard output is an advertisement or a movement of money – the road is going to be much more difficult. Stated another way, without affecting another process or result, claims to economic practices will be difficult to patent. This is reflected in how the tests are applied to claims with those characteristics, as well as who is applying tests to claims with those characteristics (our friends in Art Unit 3600).

4. The More Recent Federal Circuit Cases

The following cases were not converted into examples by the USPTO, but we think they are worth noting. While these cases may be less influential with Examiners given the new 2019 Revised SME guidance, they could still be helpful on appeal. We have decided to treat the cases in this section as if the USPTO had made examples of each of them, selecting an exemplary claim and adding comments. From my perspective, taken as a whole, these cases seem to reflect panels of the Federal Circuit moving along the same path laid out by the USPTO in its guidance. As a result, these cases seem to have started the process of reinforcing aspects of the guidance and bolstering them with more current Federal Circuit caselaw and reasoning.

Finjan Inc. v. Blue Coat Systems Inc. (Fed. Cir. Jan. 2016) provides our first case from the Federal Circuit for review. The claim we selected from this case recites:

> 1. A method comprising:
> > receiving by an inspector a Downloadable;
> > generating by the inspector a first Downloadable security profile that identifies suspicious code in the received Downloadable; and
> > linking by the inspector the first Downloadable security profile to the Downloadable before a web server makes the Downloadable available to web clients.

The Federal Circuit found that the claims were directed to a non-abstract improvement in computer functionality rather than the abstract idea of computer security in general. The Court found the improvement to be the ability of the claims to protect the user against both previously unknown viruses and "obfuscated code" as an improvement over traditional virus scanning that only identifies known viruses. Interestingly, the lower court found the claims in *Finjan* to be similar to the USPTO Abstract Idea Example 1.

Enfish v. Microsoft Corp. (Fed. Cir. May 2016) provides our second case from the Federal Circuit for review. The claim we selected recites:

17. A data storage and retrieval system for a computer memory, comprising:
means for configuring said memory according to a logical table, said logical table including:
> a plurality of logical rows, each said logical row including an object identification number (OID) to identify each said logical row, each said logical row corresponding to a record of information;
>
> a plurality of logical columns intersecting said plurality of logical rows to define a plurality of logical cells, each said logical column including an OID to identify each said logical column; and
>
> means for indexing data stored in said table.

In analyzing this patent, the Court found the claim was not directed to an abstract idea and was thus eligible. The claims were found to be directed to a specific improvement to the way computers operate, embodied in the self-referential table. As noted above, we believe this is right in the path of the USPTO examples and guidance supporting the concept that where you have a problem and solution which are necessarily rooted in computer technology, you step out of the significantly more analysis entirely either through having no "abstract idea" to begin with or at a minimum through the streamlined analysis which indicates that the claim is not directed to an abstract idea. In support of another theory developed through analysis of the USPTO examples, in making this finding, the Court relied on the specification's detailed description of the improvements flowing from the claimed design. The story in the specification, even where it was not expressly included in the claims, supported the decision that 101 did not apply.

McRo Inc. v. Bandai Games America (Fed. Cir. Sept. 2016) provides our third case from the Federal Circuit for review. The claim we selected from this case recites:

> 1. A method for automatically animating lip synchronization and facial expression of three-dimensional characters comprising:
> > obtaining a first set of rules that define output morph weight set stream as a function of phoneme sequence and time of said phoneme sequence;
> >
> > obtaining a timed data file of phonemes having a plurality of sub-sequences;
> >
> > generating an intermediate stream of output morph weight sets and a plurality of transition parameters between two adjacent morph weight sets by evaluating said plurality of sub-sequences against said first set of rules;
> >
> > generating a final stream of output morph weight sets at a desired frame rate from said intermediate stream of output morph weight sets and said plurality of transition parameters; and
> >
> > applying said final stream of output morph weight sets to a sequence of animated characters to produce lip synchronization and facial expression control of said animated characters.

The Federal Circuit found the claims were directed to the use of specific rules against specific sub-sequences, which was more specific than generically applying any rules. The Court went on to find that the application of specific rules does not preempt the application of any or all rules. Without the preemption of all rule based means of automated lip synchronization, the claims were significantly more than the abstract idea of applying rules to the synchronization process. As with *Diehr*, the specification contained a description of

specific rules that were used with the synchronization process. Thus, the more specific application of the claims saved the claim from being generically applied. Here the Court followed the Supreme Court language about pre-emption as a key concern in the 101 analysis. This appears to mirror the discussion of the *Diamond v. Diehr* case in Example 25, where the USPTO points out that the claim adds reasonable limits to the use of the formula, echoing the concerns about pre-emption of an entire abstract space.

Core Wireless Licensing S.A.R.L. v. LG Electronics, Inc. (Fed. Cir. Sept. 2018) provides our fourth and final case from the Federal Circuit for review. The claim we selected from this case recites:

> 1. A computing device comprising a display screen,
>> the computing device being configured to display on the screen a menu listing one or more applications,
>> and additionally being configured to display on the screen an application summary that can be reached directly from the menu,
>> wherein the application summary displays a limited list of data offered within the one or more applications, each of the data in the list being selectable to launch the respective application and enable the selected data to be seen within the respective application, and
>> wherein the application summary is displayed while the one or more applications are in an un-launched state.

The Federal Circuit in this case found that the claims were directed to an improved user interface for electronic devices, which was more limited than a mere index. Further, the Court found that the claims specify the type of data to be displayed and how to display it, thereby improving on conventional user interfaces to increase efficiency of using mobile devices.

5. *The New Examples Applying the 2019 Revised SME Guidance (Examples 37-42)*

In the new examples, the USPTO crafted claims independently to establish their points. Example 37 is the first USPTO Example illustrating the application of the 2019 Revised SME Guidance. The first claim considered in this example recites:

> 1. A method of rearranging icons on a graphical user interface (GUI) of a computer system, the method comprising:
>> receiving, via the GUI, a user selection to organize each icon based on a specific criteria, wherein the specific criteria is an amount of use of each icon;
>> determining, by a processor, the amount of use of each icon over a predetermined period of time; and
>> automatically moving the most used icons to a position on the GUI closest to the start icon of the computer system based on the determined amount of use.

The claim recites a limitation of determining the amount of use of each icon over a predetermined period of time, performed "by a processor." The USPTO found that this limitation covers performance in the human mind, with the additional of a generic computer component, and therefore the claim recites an abstract idea among the grouping of Mental Processes. However, the USPTO found that the additional elements of receiving and automatically moving integrated the abstract idea into a practical application that provides a specific improvement over prior systems. Thus, the claim is not directed to the abstract idea and is eligible.

The second claim considered in Example 37 recites:

2. A method of rearranging icons on a graphical user interface (GUI) of a computer system, the method comprising:
    receiving, via the GUI, a user selection to organize each icon based on a specific criteria, wherein the specific criteria is an amount of use of each icon;
    determining the amount of use of each icon using a processor that tracks how much memory has been allocated to each application associated with each icon over a predetermined period of time; and
    automatically moving the most used icons to a position on the GUI closest to the start icon of the computer system based on the determined amount of use.

This claim recites a more detailed determining limitation that specifies how the processor is being used to determine the amount of use of each icon – by tracking how much memory has been allocated to each application associated with each icon over a predetermined period of time. The USPTO found that this limitation does not cover performance in the human mind since the determining is *not practically performed in the human mind* at least because of the requirement for the processor to access the computer memory indicative of application usage. Since the claim did not recite any other limitation included among the abstract idea groupings of the 2019 Revised SME Guidance, the claim does not recite a judicial exception and is eligible.

The third claim considered in Example 37 recites:

3. A method of ranking icons of a computer system, the method comprising:
    determining, by a processor, the amount of use of each icon over a predetermined period of time; and
    ranking the icons, by the processor, based on the determined amount of use.

Note that this claim recites determining and ranking performed "by a processor." As with the first claim considered by Example 37, the third claim covers performance in the human mind, with the additional of a generic computer component, and therefore the claim recites an abstract idea among the grouping of Mental Processes. However, unlike the first claim considered by Example 37, the USPTO found that only additional element is the processor, which does not integrate the abstract idea into a practical application. Thus, the claim is directed to the abstract idea. With regard to Step 2B, the USPTO found that the processor also does not provide significantly more as the additional element amounts to no more than mere instructions to apply the exception using a generic computer component, and therefore the claim is ineligible.

Example 38 is the second USPTO Example illustrating the application of the 2019 Revised SME Guidance. The only claim considered in this example recites:

> 1. A method for providing a digital computer simulation of an analog audio mixer comprising:
> initializing a model of an analog circuit in the digital computer, said model including a location, initial value, and a manufacturing tolerance range for each of the circuit elements within the analog circuit;
> generating a normally distributed first random value for each circuit element, using a pseudo random number generator, based on a respective initial value and manufacturing tolerance range; and
> simulating a first digital representation of the analog circuit based on the first random value and the location of each circuit element within the analog circuit.

The claim recites limitations of initializing a model, generating a random value, and simulating a digital representation of the analog circuit. While these claim limitations may be *based on mathematical concepts*, the USPTO found that they do not explicitly recite or claim the mathematical concepts. Since the claim did not recite any other limitation included among the abstract idea groupings of the 2019 Revised SME Guidance, the claim does not recite a judicial exception and is eligible.

Example 39 is the third USPTO Example illustrating the application of the 2019 Revised SME Guidance. The only claim considered in this example recites:

> 1. A computer-implemented method of training a neural network for facial detection comprising:
> collecting a set of digital facial images from a database;
> applying one or more transformations to each digital facial image including mirroring, rotating, smoothing, or contrast reduction to create a modified set of digital facial images;
> creating a first training set comprising the collected set of digital facial images, the modified set of digital facial images, and a set of digital non-facial images;
> training the neural network in a first stage using the first training set;
> creating a second training set for a second stage of training comprising the first training set and digital non-facial images that are incorrectly detected as facial images after the first stage of training; and
> training the neural network in a second stage using the second training set.

The claim recites limitations of applying transformations and training a neural network. As in the previous example, while these claim limitations may be *based on mathematical concepts*, the USPTO found that they do not explicitly recite or claim the mathematical concepts. Since the claim did not recite any other limitation included among the abstract idea groupings of the 2019 Revised SME Guidance, the claim does not recite a judicial exception and is eligible.

Example 40 is the fourth USPTO Example illustrating the application of the 2019 Revised SME Guidance. The first claim considered in this example recites:

> 1. A method for adaptive monitoring of traffic data through a network appliance connected between computing devices in a network, the method comprising:
>> collecting, by the network appliance, traffic data relating to the network traffic passing through the network appliance, the traffic data comprising at least one of network delay, packet loss, or jitter;
>> comparing, by the network appliance, at least one of the collected traffic data to a predefined threshold; and
>> collecting additional traffic data relating to the network traffic when the collected traffic data is greater than the predefined threshold, the additional traffic data comprising NetFlow protocol data.

The claim recites a limitation of comparing collected traffic data to a predefined threshold performed by a network appliance. The USPTO found that this claim element covers performance in the human mind, with the addition of a generic computer component, and thus the claim recites an abstract idea among the grouping of Mental Processes. However, the claim includes additional elements of collecting traffic data and collecting additional traffic data when the collected traffic data is greater than a threshold. The USPTO found that these additional elements recite a specific manner of collecting additional data whenever the initially collected data reflects an abnormal condition (i.e., exceeds a threshold), which improves the collection of traffic data over prior art systems and integrates the abstract idea into a practical application. Thus, the claim is not directed to an abstract idea and is eligible.

The second claim considered in Example 40 recites:

> 2. A method for monitoring of traffic data through a network appliance connected between computing devices in a network, the method comprising:
>> collecting, by the network appliance, traffic data relating to the network traffic passing through the network appliance, the traffic data comprising at least one of network delay, packet loss, or jitter; and
>> comparing, by the network appliance, at least one of the collected traffic data to a predefined threshold.

The claim recites a limitation of comparing collected traffic data to a predefined threshold performed by a network appliance. Just as with the first claim of Example 40, the USPTO found that this claim element covers performance in the human mind, with the addition of a generic computer component, and thus the claim recites an abstract idea among the grouping of Mental Processes. However, in contrast to the first claim of Example 40, the only additional claim element is collecting traffic data, which is recited at a high level of generality. The USPTO found that this additional element is insignificant extra-solution activity, and therefore the claim is directed to an abstract idea.

Further, the USPTO found that the additional element does not provide significantly more under Step 2B as the additional element in the claim amount to no more than mere instructions to apply the exception using a generic computer component. The USPTO notes in this example that the additional element considered to be insignificant extra-solution activity in Step 2A should be re-evaluated at Step 2B to determine if it is more than what is well-understood, routine, conventional activity in the field. Since the background of this example

does not provide any indication that the network appliance is anything other than a generic, off-the-shelf computer component, and in order to comply with *Berkheimer* (specifically Option 2 of *Berkheimer*), the USPTO notes two court decisions that indicate that the mere collection and receipt of data over a network is well-understood, routine, and conventional when claimed in a generic manner as it is in this claim. Thus, the claim is ineligible.

Example 41 is the fourth USPTO Example illustrating the application of the 2019 Revised SME Guidance. The only claim considered in this example recites:

> 1. A method for establishing cryptographic communications between a first computer terminal and a second computer terminal comprising:
>> receiving a plaintext word signal at the first computer terminal;
>> transforming the plaintext word signal to one or more message block word signals MA;
>> encoding each of the message block word signals MA to produce a ciphertext word signal CA, whereby CA=MAe (mod n);
>>> where CA is a number representative of an encoded form of message word MA;
>>> where MA corresponds to a number representative of a message and $0 \leq MA \leq n\text{-}1$;
>>> where n is a composite number of the form n=p*q;
>>> where p and q are prime numbers;
>>> where e is a number relatively prime to (p-1)*(q-1); and
>> transmitting the ciphertext word signal CA to the second computer terminal over a communication channel.

This claim recites a limitation of encoding a message according to a formula. Since the claim explicitly recites that the encoding is being performed according to the recited formula, the claim limitation recites a Mathematical Concept. Thus, the claim recites an abstract idea. However, the USPTO found that the claim includes additional elements of receiving, transforming, and transmitting that use the mathematical concept in a specific manner that sufficiently limits the use of the mathematical concept to a practical application of transmitting the resulting ciphertext word signal to a computer terminal over a communication channel. Thus, the claim is not directed to an abstract idea and is eligible.

Example 42 is the fifth USPTO Example illustrating the application of the 2019 Revised SME Guidance. The first claim considered in this example recites:

> 1. A method comprising:
>> a) storing information in a standardized format about a patient's condition in a plurality of network-based non-transitory storage devices having a collection of medical records stored thereon;
>> b) providing remote access to users over a network so any one of the users can update the information about the patient's condition in the collection of medical records in real time through a graphical user interface, wherein the one of the users provides the updated information in a non-standardized format dependent on the hardware and software platform used by the one of the users;

c) converting, by a content server, the non-standardized updated information into the standardized format;

d) storing the standardized updated information about the patient's condition in the collection of medical records in the standardized format;

e) automatically generating a message containing the updated information about the patient's condition by the content server whenever updated information has been stored; and

f) transmitting the message to all of the users over the computer network in real time, so that each user has immediate access to up-to-date patient information.

The claim allows users to access patients' medical records and receive updated information in real time from other users. The USPTO found that the claim limitations are a method of managing relationships or interactions between people, and thus the claim recites an abstract idea among the grouping of Certain Methods of Organizing Human Activity. The claim includes additional elements of storing, providing real-time remote access to receive information in a non-standardized format information, converting the non-standardized format information to standardized format information, storing the standardized format information, automatically generating a message, and transmitting the message to all users in real time. The USPTO found that additional elements amount to a specific improvement over prior art systems by allowing remote users to share information in real time in a standardized format regardless of the non-standardized format in which the information was provided by the user, and therefore integrate the abstract idea into a practical application. Thus, the claim is not directed to an abstract idea and is eligible.

The second claim considered in Example 42 recites:

2. A method comprising:

a) storing information about a patient's condition in a plurality of network-based non-transitory storage devices having a collection of medical records stored thereon;

b) providing access, by a content server, to users so that any one of the users can update the information about the patient's condition in the collection of medical records, and;

c) storing the updated information about the patient's condition in the collection of medical records in the plurality of network-based non-transitory storage devices.

The claim allows users to access patients' medical records, update the records, and store the updated records. As with the first claim of Example 42, the USPTO found that the claim limitations are a method of managing relationships or interactions between people, and thus the claim recites an abstract idea among the grouping of Certain Methods of Organizing Human Activity. The claim includes additional elements of storing the information in a plurality of network storage devices. The USPTO found that additional elements merely describe how the abstract idea is applied and do not integrate the abstract idea into a practical application. While there are computer components recited in the claims, the USPTO noted that those computer components are recited at a high level of generality and implementing an abstract idea on a generic computer is not a practical application of the abstract idea. Thus, the claim is directed to the abstract idea. With regard to Step 2B, the USPTO found that the claim as

whole merely describes how to generally "apply" the concept of updating medical records in a computer environment, and therefore, nothing in the claims adds significantly more. As such, the claim is ineligible.

6. The Newest Examples from October 2019 Applying the 2019 Revised SME Guidance (Examples 45 and 46)

In the newest examples from October 2019, the USPTO crafted additional claims independently to establish their points. While Example 45 is the first of the newest USPTO Examples applicable to software/computer implemented inventions, it is also the third time the USPTO has dipped into the very favorable waters of the *Diamond v. Diehr* claim structure. The first claim in Example 45 recites:

> 1. A controller for an injection molding apparatus having a mold defining a cavity for receiving uncured polyurethane that is heated to form a molded article during a cycle of operation of the apparatus, the controller configured to:
> (a) repeatedly obtain measurements of the temperature of a mold;
> (b) calculate an extent of curing completion of polyurethane in the mold using the obtained temperatures and the Arrhenius equation; and
> (c) determine the extent that the polyurethane is cured as a percentage.

The USPTO found that the claim recites abstract ideas of: a mathematical concept abstract idea, a mental process abstract idea, and a law of nature. The claim includes an additional element of a controller configured to repeatedly obtain measurements of the mold temperature. The USPTO then analyzed the additional element to determine whether it is insignificant extra-solution activity and found that it is mere data gathering that is necessary to performance of the recited abstract idea(s) and is recited at a high level of generality. Thus, the additional element is insignificant extra-solution activity. Please note that the focus placed on insignificant extra-solution activity at Step 2A is a new development in the October 2019 Patent Eligibility Guidance Update. Since the only additional element is insignificant extra-solution activity, the USPTO found that claim 1 is directed to the abstract idea. The USPTO also found that the claim does not include significantly more than the abstract idea under Step 2B and is therefore ineligible.

The second claim considered in Example 45 depends from claim 1 and recites:

> 2. The controller of claim 1, which is further configured to:
> (d) send control signals to the injection molding apparatus once the polyurethane has reached a target percentage, the control signals instructing the apparatus to open the mold and eject the molded polyurethane from the mold.

Due to its dependence on claim 1, the USPTO found that claim 2 recites abstract ideas of: a mathematical concept abstract idea, a mental process abstract idea, and a law of nature. However, claim 2 includes an additional element of a controller being configured to send control signals instructing an apparatus to open a mold and eject molded polyurethane from the mold once the polyurethane has reached a target percentage determined at claim 1. The additional element reflects an improvement on previous controllers used in injection molding

because it avoids the problems associates with under-curing and over-curing of the polyurethane, which can negatively affect the polyurethane. The additional element also reflects an "other meaningful limitation" because it takes corrective action and controls the mold based on information obtained according to the recited abstract idea. Thus, the USPTO found that the the additional element integrates the abstract idea into a practical application and claim 2 is therefore eligible at Step 2A, second prong.

The third claim considered in Example 45 depends from claim 1 and recites:

3. A system comprising the controller of claim 1 connected to a means for temperature measuring that repeatedly measures the temperature of the mold.

Due to its dependence on claim 1, the USPTO found that claim 3 recites abstract ideas of: a mathematical concept abstract idea, a mental process abstract idea, and a law of nature. Claim 3 includes an additional element of a means for temperature measuring that repeatedly measures the temperature of the mold. The specification defines the means for temperature measuring as an ARCXY thermocouple (and equivalents thereof). The USPTO determined that the additional element is mere data gathering that is necessary for performance of the recited abstract idea(s) and therefore the additional element is insignificant extra-solution activity. Because whether or not the ARCXY thermocouple is well-known is not considered at Step 2A, the ARCXY thermocouple cannot be considered a "particular machine" as its involvement in the claims is only as insignificant extra-solution activity. At Step 2B, use of an ARCXY thermocouple to measure mold temperatures is determined to not be well known. This determination is made because the only reference found relating to ARCXY thermocouples discusses measuring temperatures repeatedly in conjunction with spacecraft and vehicles used on other planets where particularly robust equipment is required. Mere knowledge of this type of thermocouple in the aeronautical industry does not make its use in an injection molding apparatus well-known, routine, or conventional. Because use of an ARCXY thermocouple to measure mold temperatures is determined to not be well known, the claim element of a controller configured to repeatedly obtain measurements of the temperature of a mold using an ARCXY thermocouple is no longer considered to be insignificant extra-solution activity because of various benefits of the ARXCY thermocouple over other thermocouples. Thus, the USPTO found that claim 3 amounts to significantly more than the abstract idea because of the unconventional use of the ARCXY thermocouple and is eligible at Step 2B. In a callback to earlier discussions, the story about the various benefits of the specifically claimed (albeit by means function limitation) thermocouple helps carry the day again even though the benefits are not present in the claims expressly.

The last claim considered in Example 45 is claim 4. Claim 4 recites:

4. A controller for an injection molding apparatus having a mold defining a cavity for receiving uncured polyurethane that is heated to form a molded article during a cycle of operation of the apparatus, the controller configured to:
   (a) send a control signal to the injection molding apparatus to regulate injection of uncured polyurethane into the mold, and to heat the mold to a target temperature to cure the polyurethane;
   (b) repeatedly obtain temperature measurements of the mold;
   (c) compare the obtained temperatures to a target temperature; and

(d) maintain temperature of the mold within two degrees of the target temperature by sending a control signal to the apparatus to selectively heat or cool the mold when the obtained temperature of the mold is more than two degrees different than the target temperature.

Claim 4 recites a concept that falls into the "mental process" group of abstract ideas. Claim 4 includes an additional element specifying that the controller is configured to send a control signal instructing the apparatus to selectively heat or cool the mold when the measured temperature is more than two degrees different than the target temperature. The USPTO found that the additional element reflects an improvement on previous controllers used in injection molding because it avoids the problems associates with under-curing and over-curing of the polyurethane, which can negatively affect the polyurethane. The additional element also reflects an "other meaningful limitation" because it takes corrective action and controls the mold based on information obtained according to the recited abstract idea. Thus, the USPTO found that the additional element integrates the abstract idea into a practical application and claim 4 is eligible at Step 2A, second prong.

Turning to the next example, Example 46 is the last example of the newest USPTO Examples. The first claim in Example 46 recites:

1.   A system for monitoring health and activity in dairy livestock animals comprising:
    a memory;
    a display; and
    a processor coupled to the memory programmed with executable instructions, the instructions including
        a livestock interface for obtaining animal-specific information, wherein the animal-specific information comprises animal identification data and at least one of body position data, body temperature data, feeding behavior data, and movement pattern data; and
    a monitoring component for
        (a) comparing the obtained animal-specific information with animal information from a herd database to verify an animal's identity, and
        (b) analyzing the obtained animal-specific information to identify whether the animal is exhibiting an aberrant behavioral pattern as compared to past behavior of the animal, and
        (c) displaying the analysis results for the animal on the display.

Claim 1 recites multiple concepts that fall into the "mental process" group of abstract ideas. The claim includes additional elements of a memory, display, processor, livestock interface, and displaying the analysis results for the animal on the display. The memory, display, and processor are recited generically so as to be mere instructions to apply the abstract idea on a computer. The livestock interface represents mere data gathering that is insignificant extra-solution activity. The displaying of analysis results is extra-solution activity because it is a mere nominal or tangential addition to the claim. Because the only additional elements are insignificant extra-solution activity, the USPTO found that claim 1 is directed to the abstract idea. The USPTO also found that claim 1 does not include significantly more than the abstract idea under Step 2B and is therefore ineligible.

The second claim considered in Example 46 depends from claim 1 and recites:

2.   The system of claim 1, wherein the system further comprises:
        a feed dispenser that is connected to a feed and supplement supply and
                is operable to dispense individualized amounts of feed and
                optional supplements, and
        wherein the monitoring component is further configured for
                (d) automatically sending a control signal to the feed dispenser to
                        dispense a therapeutically effective amount of
                        supplemental salt and minerals mixed with feed when the
                        analysis results for the animal indicate that the animal is
                        exhibiting an aberrant behavioral pattern indicative of
                        grass tetany.

Due to its dependence on claim 1, the USPTO found that claim 2 recites multiple concepts that fall into the "mental process" group of abstract ideas. The claim includes the same additional elements as claim 1, as well as the feed dispenser and automatically sending a control signal to the feed dispenser to dispense a therapeutically effective amount of supplemental salt and minerals mixed with feed when the analysis results for the animal indicate that the animal is exhibiting an aberrant behavioral pattern indicative of grass tetany. The USPTO found that the additional elements added in claim 2 add a meaningful limitation in that it employs the information provided by the judicial exception to control the feed dispenser. Using the information provided by the judicial exception to control the feed dispenser in a particular way is an "other meaningful limitation" that integrates the judicial exception into a practical application of the livestock management scheme and therefore the USPTO found that claim 2 is eligible at Step 2A, second prong. This should be good support for arguments that even if the actual controlling of an element in the real world is not in and of itself that complex – it "integrates" the novel work with the abstract idea into a practical application. Note the office does not ignore the abstract idea for this analysis which is distinct from the approach some Examiners try to take.

The third claim considered in Example 46 recites:

3. A method for monitoring health and activity in dairy livestock animals comprising:

      (a) causing a herd of livestock animals to enter a sorting gate that is automatically operable, wherein each animal in the herd is equipped with an animal sensor having a radio frequency transponder,

      (b) for a particular animal in the herd, obtaining, by a radio frequency reader mounted on or near the sorting gate, animal-specific information from the animal sensor when the animal sensor is within proximity to the radio frequency reader, the animal-specific information comprising animal identification data and at least one of body position data, body temperature data, feeding behavior data, and movement pattern data,

      (c) analyzing, by a processor, the obtained animal-specific information from step (ii) with respect to animal information stored in a herd database to identify the animal and to determine whether the animal is exhibiting an aberrant behavioral pattern as compared to the past behavior of the animal,

      (d) automatically operating the sorting gate, by the processor sending a control signal to the sorting gate to route the animal into a holding pen when the analysis results from step (iii) for the animal indicate that the animal is exhibiting an aberrant behavioral pattern, and by the processor sending a control signal to the sorting gate to permit the animal to freely pass through the sorting gate when the analysis results for the animal indicate that the animal is not exhibiting an aberrant behavioral pattern, and

      (e) repeating steps (b) through (d) for each animal in the herd.

The USPTO found that claim 3 recites multiple concepts that fall into the "mental process" group of abstract ideas. The claim includes the additional elements of (a), (b), (d), and (e), and the processor that performs step (c). The USPTO found that steps (a) and (e) are nothing more than an attempt to generally link the use of the judicial exception to the particular field of livestock management. Step (b) was found to represent mere data gathering and step (c) was found to represent no more than mere instructions to apply the judicial exception using generic computer components. However, the USPTO found that step (d) goes beyond merely automating the abstract ideas and instead actually uses the information obtained by the judicial exception to take corrective action by operating the gate and routing the animals in a particular way. This is an "other meaningful limitation" that integrates the judicial exception into a practical application of the livestock management scheme and therefore the USPTO found that claim 3 is eligible at Step 2A, second prong.

      The last claim considered in Example 46 is claim 4. Claim 4 recites:

4.   A system for monitoring health and activity in a herd of dairy livestock animals comprising:

a memory;

a processor coupled to the memory programmed with executable instructions, the instructions including a livestock interface for obtaining animal-specific information for a plurality of animals in the herd, wherein the animal-specific information comprises animal identification data and at least one of body position data, body temperature data, feeding behavior data, and movement pattern data; and

a herd monitor including (a) a radio frequency reader for collecting the animal-specific information from a plurality of animal sensors attached to the animals in the herd when the animal sensors are within proximity to the radio frequency reader, each animal sensor having a radio frequency transponder, and (b) a transmitter for transmitting the collected animal-specific information to the livestock interface.

The USPTO found that claim 4 does not recite an abstract idea or other judicial exception. While the system's operation is based on mathematical theory, the mathematical theory is not set forth or described in the claim. Also, the claim involves the observation the behavior of the livestock animals which is a natural phenomenon or law of nature. However, this limited involvement is not significant enough to qualify as reciting a natural phenomenon or law of nature. Because claim 4 does not recite an abstract idea or other judicial exception, claim 4 is eligible at Step 2A, first prong. This example probably shocked some Examiners who would argue for similar structures that all that is recited is a processor, an RF reader, and a transmitter which they would try to discount as each being routine computer components with the only other description being informational data which is abstract. This example may be used to push back against a claim interpretation approach which tries to separate the "routine" mechanical elements and only look at the limitations remaining and assess them as abstract.

Having touched on a selection of the USPTO's older published examples and their new examples applying the 2019 Revised SME Guidance as well as some of the more notable Federal Circuit cases in the format of the examples, we turn our attention to some potentially interesting observations followed by specific recommendations and discussions.

C. Echoes from the Past: A Particular Machine

This section reflects an observation which could suggest a pathway for useful arguments. It is drawn from the discussions in the guidance and the caselaw that we believe call back an older body of law which could prove useful at a minimum for analogy in identifying the most appropriate path between eligible and ineligible subject matter.

In the 2019 Revised SME Guidance, the USPTO acknowledged that one factor in the consideration of whether the abstract idea is integrated into a practical application is whether "an additional element implements a judicial exception with, or uses a judicial exception in conjunction with, a particular machine or manufacture that is integral to the claim." The USPTO also acknowledged that one factor in the consideration of a "significantly more" element is whether a special purpose computer is involved. This special purpose computer framework is based on the machine-or-transformation test, which the Supreme Course has explained can be one factor when considering the claims. We note MPEP 2106.05(b), which discusses aspects of what makes a computer a particular machine. We also note that the

underlying caselaw supporting what is considered to be a special purpose computer remains the same and has not been overruled. Special purpose computers are considered to be a machine and can be recited as general computer components. A general computer component is "particular" when programmed to perform "enough" process steps to create a new machine. Adding a computer component to an abstract idea was not enough where the claim is silent as to how the computer aids the method. Recitation of a "processor" or "computer system" should not doom the claim merely because their use has permeated modern society. Instead, the specific process and configurations of the machines is what makes them particular, and not generic.

A particular machine is one that is programmed to perform the steps of the method and limits the use of the machine to the claimed combination of elements. If the claim is too broad and covers all practical applications of an exception, the computer would not be "particular" enough. Integral use of the machine leads to eligibility under this framework whereas using the computer as an object on which the method operates does not. This framework is very similar to that described in the guidance, and the considerations for making the computer particular enough are still relevant in an analysis under the current 101 standards. Relevant cases include *In re Alappat*, 33 F.3d 1526 (Fed. Cir. 1994) (the first case establishing the special purpose concept but in the context of a means plus function claiming); *Bilski v. Kappos*, 561 U.S. 593 (2010); *Cybersouce v. Retail Decisions*, 654 F.3d 1366 (Fed. Cir. 2011). In *Eon Corp. IP Holdings LLC v. AT&T Mobility LLC* (Fed. Cir. 2014), the Court noted that the case of *In re Alappat* had been superseded in part by *Bilski* and *Alice*, however this assertion was only with respect to certain aspects of the case and not with regard to the reasoning underlying what made a computer a special purpose computer, and therefore distinct from a "generic computer." The cases of *WMS Gaming* and *Katz* (which provide the specific language about the special purpose computers) remain correctly decided and have not been overruled.

D. **Sliding Scale between 35 U.S.C. § 101 and 35 U.S.C § 112**

For years, USPTO insiders have suggested that full and vigorous application of section 112 written description and enablement requirements is the better alternative to the shift in subject matter eligibility. We are now seeing this shift as the subject matter eligibility standard for section 101 eases. For example, the USPTO has implemented 112 training and we are seeing that rejections under 112 are increasing in number and vigorousness. To help combat these 112 rejections, as will be discussed in more detail below, we suggest developing a robust, full disclosure. For example, we recommend drafting more thoroughly to provide varied express textual support. We also suggest that the claims be amended more carefully during prosecution based on textual support and that the textual support be found ahead of the amendment in case justification is needed. Literal support for amendments is still not necessary, but we believe the room for inference and inherency is shrinking.

V. *Drafting Recommendations – How Do I Develop my Disclosure and Draft My Application to Best Prepare for (or Avoid) a 35 U.S.C § 101 rejection?*

A. **Introduction**

As life continues in the post-*Alice* world, there is an opportunity to draft applications that incorporate support not only for the invention, but also for patentable subject matter. During the drafting process, the ability to build in support for the claims covering patentable

subject matter begins with the invention disclosure meeting. During this time, the story of the invention can be developed to explain why the subject matter has real world inputs and outputs, why it improves a computer, and how the components interact with each other and outside elements.

From a high level view, subject matter that could involve an abstract idea should be examined to determine how any description would be seen by an outside observer. While the standard description should be drafted for the understanding of one of ordinary skill in the art, more detail may be needed to convey the invention to the other observers in the patenting process such as the Examiner, a Patent Trial and Appeals Board judge, a juror, or even a competitor.

Arthur C. Clarke stated in his Third Law that "any sufficiently advanced technology is indistinguishable from magic." This statement applies equally well to abstract ideas in the realm of patents. For example, the line between abstract and non-abstract lies largely in the mind and understanding of the observer. We stated earlier that the Patent Office is not into thought control. It is equally true that they are not into patenting magic. An engine with a control system is generally understood by Examiners and Judges and others as having a large series of gears and cogs and other widgets cooperating together to produce a mechanical result. Even if described or claimed lightly – it is not taken as magic, and the eligibility of a claim directed to this subject matter is "self-evident" according to the USPTO. Compare any readily understood technologies with a claim to a computer performing advanced calculations without an observable output. This subject matter is not easily understood, whether it be in the actual implementation or the uses of the resulting calculations. Such a process may appear as magic to those not skilled in the computer arts (and may even appear to be magic in this situation depending on the level of complexity). This is particularly true where an approach to claiming, or worse the specification, comes from a black box perspective. Simply identifying a box and labeling it with a function with no sense of what might happen inside the box (other than some kind of magic to transform the inputs into the outputs) reinforces the sense that we are not disclosing actual inventions but more abstract ideas that mystically occur. An adequate description is then needed in order to fully explain the invention and the context in which it operates. At least in the specification, make sure to get into the computer equivalent of the gears and cogs and levers of how the information arrives, is exchanged, is transformed, and exits to create an impact. Obviously, do so in the alternative where it makes sense to maintain an appropriate breadth of scope while still working with effective implementations rather than more abstract wishes. Help them feel and see the IT engine running so that the invention and any claims are not seen as magic during prosecution and enforcement actions.

B. The Invention within the Invention

One of the challenges I often face is top down identification of desired functional results from important projects with an instruction to get in with the inventors and figure out what might be patentable to protect the investment being made. The starting point for these kinds of disclosures is typically a strong business function result from an improved business process. Obviously I want to understand and describe the story of this improvement, but in the current environment there is always a risk that ultimately the subject matter may not end up being eligible. Fortunately, if the changes to the business function are new, then computer and IT systems that implement and enable those changes to work and work effectively are also going to be new. The very fact that it was a big project to implement the changes tends to be indicative of a lot of IT challenges and IT innovations to overcome them. My mission becomes

working with the inventors through the disclosure meeting(s) to discover the IT inventions within the overall business function invention.   Then I am able to draft a robust disclosure that tells the story of the business challenges and the business invention (and possibly even take my best shot at a claim at this level) but also explore the underlying IT challenges and the solutions to them which enabled the positive business results to flow.   This establishes a fallback position which may act in support of the subject matter eligibility of the overall business function improvement, may be blended with it in the claims to provide eligibility, or may stand alone for eligibility.

Even outside of the problem of large projects about change in business processes, to further aid in the drafting process, the level of abstractness of the description of the invention should be fully addressed. Most inventors begin with a concept of an invention that may be at somewhat of a high level in areas that could involve claims directed to abstract ideas. The original concept can be modified by either being further abstracted to a more general idea, or more fully fleshed out to begin to reach the various implementation details. While the scope of the description should address both areas, further refinements to the original concept can often lead to specific implementations that may support patentability on their own. These may also be referred to as inventions within the invention. With respect to the present guidance on patentable subject matter, the additional details that are often present in specific implementations can provide additional support for patentability in the same way that they provide additional support for potential concerns about obviousness rejections under 35 U.S.C. § 103.

As an example of this latter invention within the invention concept, imagine a communication device that sends and receives various signals. The manner in which the signals are sent and received may be inventive, but claims to a concept involve sending and receiving are often considered abstract without additional elements. In order to flesh out the invention as part of the full description so that the device is not considered a magic box, the specific details of what the device includes that enables its communication, how the signals are processed, and what additional components are needed in order to allow the entire system to operate can be included in the description. These specific implementation details may then provide the details needed to bring any claims out of the realm of abstractness and into the realm of patentable subject matter. While the broader description is useful to provide support for broader claims, these details may be useful during prosecution to have available in the event of a rejection under 35 U.S.C. § 101.

The concept of invention within the invention leads to identifying IT, architecture, and software inventions which are enablers and ideally key enablers supporting the more business functional invention. By protecting key pathways, even if the overall functional coverage is not obtainable, roadblocks are still put up forcing effort and development time to find alternate paths. If the enablers are strong enough, the function itself may be impacted by competitors trying to run in to copy your client's hard work and shortcut the normal development path in their race to compete. Additionally, when it is desirable to try and target different art units or technology centers as discussed below, the enabling IT inventions provide a potentially beneficial focus for the title, abstract, and first claims of the application and the overall functional insights can be brought in the back door potentially helping direct the application to a more protective harbor of a particular technology center or art unit.

C. The Disclosure Meeting

1. Overview

The details developed in a description of one or more implementations may also be useful in protecting an invention. While additional details may narrow any claims around an idea, the ability to protect the most probable implementations may be sufficient to protect the original concept itself. This represents a trade-off between being able to fully protect an invention that may be considered to include an abstract idea and the degree of protection afforded by one or more specific implementations. The value of the balance should be considered during the drafting process to allow sufficient details to be included to provide the appropriate scope of protection.

The time to develop the details needed to support patent eligible claims begins with the invention disclosure meeting. The inventors are in the best position to fully describe the details surrounding the invention. The discussion should serve to pull the details out from the inventors, and if the inventors do not have the details, they should be prompted to develop them in the meeting or report them back prior to filing the application. The inventors should be able to describe the inputs and outputs from an invention as well as the actual processing occurring on any computerized device. The details of any additional components that the invention is interacting with should also be discussed.

The disclosure meeting also represents the ideal time to explore and define the story behind the invention and different aspects of the invention. The story may reflect the challenges overcome or the opportunities taken advantage of to achieve the desired results. Variants of the story should also be developed regarding the IT or computer issues that had to be built or modified and the improvements or advantages these changes could and/or did provide. How the invention came about, as well as its purpose and the actions it enables, help to bring any abstract concepts into the real world. Understanding these stories (and gaps if they exist initially) may also provide direction for further discussion of facts and details for the specification to support directions the claims may ultimately need to go.

We are not suggesting you should draft strong committing language to the story in the specification – qualifying language on advantages and benefits remain prudent, but to avoid discussing the whys at all in the current environment provides an equal risk to take into account. I heard a quote from one of my UK friends which I think is applicable here (albeit roughly paraphrased based on my imperfect memory), we should seek not only to explain the difference from the prior art but also to explain why the difference makes a difference. At least on my behalf, I need to come out of the disclosure meetings with that understanding fully in hand to do the best work I can in getting the right application drafted.

2. The Hard Inputs

The USPTO's examples demonstrate that patent eligible subject matter can be found when the inventive subject matter, which can include a portion that is directed to or involves an abstract idea, touches or is connected to something outside of itself. This allows the inputs, outputs, and other system components to be used in arguments for patent eligible subject matter. Through the disclosure meetings we regularly come back to familiar places and questions to help guide the inventors on what information we will need that might be helpful in finding and supporting the best options for our robust disclosure.

The "hard" inputs can include input devices that allow for data or signals to be received. For example, an image sensor in Digitech may have allowed for a finding that the subject matter was patent eligible as it would have added physical features to an otherwise abstract

processing system. Similarly, the GPS receiver in *SiRF Technology Inc. v. International Trade Commission* (Fed. Cir. 2010) provided the basis for patent eligible subject matter through the recitation of the input devices. The input devices can also be used to provide information on the technology field of the invention, which is also useful.

The inputs can also include specific information structures such as data types to allow for data transformations to be used internally. For example, the image types in Research Corp. Tech are specified to allow the conversion to the binary image array to be clarified along with the conversion to the halftoned image. Similarly, the structure of the input file in Example 1 is specified to include the electronic communication to allow the transformation through the parsing and extraction to clearly result in the transformed sanitized electronic communication.

3. The Hard Outputs

Similarly, the description of the "hard" outputs provide the basis for demonstrating a change based on the processing as well as tying any internal processing or other steps that could be considered abstract to the real world. The outputs also help to place a result that ends in a computer or other abstract data form within the real world and distinguish any such result from an ineligible transitory signal or thought in a person's mind. The outputs can include output devices that include physical output structures. For example, processing units and, physical products present strong evidence that a claim is not directed to an abstract idea while a display or other output device provides some form of an output, albeit not as strong as the physical product. As an example, tying a mathematical formula to a rubber press in *Diamond v. Diehr* provides a physical output device that uses the results of the mathematical calculation.

Output data structures can be important as well to show the change from the input data structures. As noted above, the recitation of the binary image array in Research Corp. Tech. and the output data structure of the electronic communication in Example 1 demonstrate the need to include the output data structures in the description and claims to demonstrate the subject matter is not only directed to an abstract idea. Example 2 is based on the claims in DDR holding. In the reasons for finding the subject matter recited in Example 2 eligible, the transformation of the data from other web pages to the resulting web page that is transmitted to a web browser is cited as one of the reasons for finding the claim to be directed to patent eligible subject matter. Further, any specification of an output that does not demonstrate a transformation of data will likely be found to be directed to an abstract idea unless additional features are present. As an example, the Digitech claims simply recited that the data that is used in the claims is combined to form a device profile without any transformation. Thus, the output structure itself demonstrates the lack of a transformation, which led to finding that the claims were only directed to an abstract idea.

Information on other components in the system should also be included. To the extent that an invention includes multiple components that interact in new ways, such interaction can be used to demonstrate the real world impacts of the system. In order to rely on the devices interacting, each device in the system should be described, at least in the description itself. For example, the use of the rubber mold in *Diamond v. Diehr*, the use of the stock viewer application and its interactions with the remote subscriber computer in Example 21, the use of the internal combustion engine with a control system in Example 26, and the various hardware components and their interaction in *SiRF Technology* all provided patent eligibility even where the claims may include elements considered to be abstract.

4. The Improvements to the Computer

For claims that are directed to an improvement of a computer or to software itself, a description of the specific improvements as well as how the technology arose from the realm of computers should be included. We try to develop a clear distinction between any prior processes that are simply being implemented on a computer and the invention that is directed to improving the computer itself. The description should describe the intermediate workings of the computer, wherein the information is stored and processed, and how any processing improves the computer and the results. Hardware interactions between various physical components can be described to further tie the invention to the computer implementation. We regularly request and disclose messaging diagrams and processing workflows should also be included as part of the description to support the internal processing routines. In addition to supporting claim amendments for patent eligible subject matter, the processing description should also provide support for any algorithms recited in the claims.

In addition to the technical aspects of the computer inventions, the story of the invention including the advantages and specific computer improvements should be developed to tie the invention to the improvement in the computer. The story should demonstrate how the various hardware and processing routines result in an improvement to the computer as opposed to an improvement in a process that has previously been performed outside of a computer. Often a description of how the problem arose in the context of a computer problem can be used to tie the solution to the computer itself.

The advantages can include a description of how the overall process is not routine or conventional. The resulting solution can be distinguished from prior solutions, particularly those performed outside of a computer. The interaction of the invention with the computer can be used to demonstrate that the overall process or system provides a greater advantage than the individual elements. Finally, the advantages can be tied to a specific field. All of these elements effectively pre-build in the arguments for patentability into the description. Being included within the description tends to carry more weight than later attorney arguments and also allows for the original intention of the application to be clearly brought forth during prosecution.

In my practice, we still follow a lot of the old school theories of being very careful on what is in the background and summary for fear of how they might be used against us in the Office or in the courtroom. But we do find a place right at the beginning of the detailed description where we attempt to develop our story of the context and solution which "may" be provided in various "embodiments" of the disclosure (so yes – as noted above, even here we do resort to "weasel words" to create some cover against future developments). This introductory section serves two strong purposes. First, recognizing that Examiners often do not have time to read the entire specification, it hits them immediately and quickly with our context and why our difference makes a difference. We hope this serves to help inform their review of our claim language. We have in recent years, as it has come to our attention that some Examiners may not read the specification at all, even occasionally adopted an approach of having an introductory claim which acts more like a picture claims but tries to tell our story in claim form. The second purpose is that on picking up the application a year or two (or more in some of the most difficult art units) down the road – we have a helpful reference point to get us back in the mindset of what we were thinking at the time we wrote the application and what the inventors and/or decision makers agreed was important at the time. As a final note – it is also helpful as the most lay-friendly element of the application for the inventors and decision makers to read and provide feedback on, which may better guide our ultimate disclosure and claims in revisions.

Perhaps most important to remember is the prominence of the story from the specification (not even necessarily being required as express elements in the claims) to supporting the eligibility of the claims as pointed out by the USPTO. The USPTO examples provide a number of instances in which patent eligibility is supported based on an improvement to the computer. Example 1 involves the parsing of an electronic message to quarantine malicious code. The inner workings of the computer are included in the claims to recite specific memory structures and the resulting differences in the data outputs. The description further described that the need for processing electronic messages only came about with the advent of the computer and electronic messages itself. Thus, the claims in light of the description were considered patent eligible. Similarly, in DDR Holdings, the claims were considered patent eligible as the problem of website manipulation only arose in the context of computer based web-pages. Similarly, Example 23 demonstrates that resizing the displayed windows on a computer display to avoid hiding text is patent eligible as resizing displayed windows with text only arose in the context of a computer display. Still further, claims directed to an operating system involve the functioning of the computer itself and are therefore eligible. The inclusion of specific computer components is useful to tie specific inventions to solutions rooted in computer technology.

5. A Final Option Where the Claims are Excellent but the Specification is Short on Story

These considerations help to provide evidence of patent eligibility within the description. If these elements are absent and the story is lacking and as a result there is difficulty in the Office proving up the improvements needed for section 101 eligibility, we do have a theoretical option to consider. We have not yet had the right opportunity to try this ourselves, but, to the extent that an application is filed without the description needed to fully describe the story and advantages, one strategy for including this subject matter includes adding this material in a continuation-in-part application. The new matter could be directed to only the 101 analysis, for example, the new matter can characterize the invention, include benefits and uses, and/or tie the results to a concrete change. Since the new material is not specifically directed to the claimed subject matter whose structures and methods were fully supported in the original filing, the claims should have an effective filing date as of the original application, and the support for addressing any 101 rejections can then be used directly from the CIP specification during prosecution of the claims. This strategy may also be useful when filing U.S. applications claiming priority from foreign applications. For these cases, additional information needed to support arguments for patent eligibility can be included potentially without affecting the priority date of the claimed subject matter.

6. The Pragmatic Decision: Try to Avoid Difficult Art Units

As part of the initial drafting of the application, the claims as well as the summary (typically a rewording of the independent claims), and potentially the title and abstract (which is typically a rewording of the first independent claim), should be taken into account in terms of how the language will be used by the Office to classify the application. The classification process largely focuses on the wording in the claims, and upon classification, the application is assigned to a specific art unit. As noted below, an application assigned to the business method groups in Art Unit 3600 will have a high likelihood of receiving a patentable subject matter rejection under 35 U.S.C. § 101.

In order to avoid this classification in the first place, the wording of the claims should be taken into account prior to filing the application. Words such as "commerce," "financial," "advertising" or other business or financial related terms will likely trigger a classification into an art unit having a high rejection rate under 35 U.S.C. § 101. Part of developing the story and the IT solution (the invention within the invention discussed above) allows for the more technical details to be included in the claims, including in the preamble. Thus, a system for providing an advertisement to a user can alternatively be cast as an automated system for delivering media files operating between multiple devices. The delivery of the media files is ultimately the IT solution used to deliver the advertisements, and therefore helps to identify the patentable subject matter of the claims. It also helps avoid the key words that can result in a classification into Art Unit 3600. While the standards should be the same among the art units, we have found that there is a predisposition among some art units to assume that certain elements are abstract despite reciting a technical solution.

As a further note, we have tried a similar option with an existing application. In this case, an application had an outstanding rejection under 35 U.S.C. § 101 with an Examiner that would not change the rejection for any reason. A continuation application was filed that recast the application in terms of the technical solution between a variety of servers and end devices for modifying and transferring data, ultimately resulting in a change in a consumer product. While the application was initially assigned differently than the parent application, the case was transferred back to the same Examiner since it was a continuation application. While this may be an anomaly, it appears that once an application is assigned to an art unit, it may be difficult to remove it from that art unit. This further demonstrates the need to properly draft the claim language prior to filing the application.

In an alternative experience, where we had an Examiner in 3600 who was working with us on an "advertising" claim which involved a new approach to user interfaces, he acknowledged that he rarely saw UI claims and was not entirely confident in how to examine them. He suggested we file the case as a continuation with a new title and abstract focusing on the user interface aspects we were shifting the claims towards anyway as well as refocusing the claim on those same aspects. While he felt he would not have success transferring the case he had already invested time in examining, he thought he could get more traction with a continuation in hand starting with the UI focused claims. We did as requested, and the Examiner was able to transfer the case to another art unit. While on the one hand it might be more noble to try and educate the current Examiner on how to allow a user interface case under the guidance, from the client's perspective we had an Examiner who had not allowed a single case with a 101 issue since *Alice* and we had the opportunity to move to an art unit whose overall allowance rate was radically higher and where 101 problems are routinely overcome. For efficiency, we were working to get to the other art unit to find the more straightforward path.

VI.   *Prosecution Recommendations – What Options Do I have with a 101 Rejection Where My Disclosure is Already Filed*

A.   **Prosecuting Applications in Art Unit 3600**

If you find an application you are prosecuting in Art Unit 3600 (especially in certain art units in 3600), chances are you will face a rejection under 35 U.S.C. § 101. The allowance rate in Art Unit 3600 significantly dropped after the *Alice* decision. However, with the new directors and issuance of the 2019 Revised SME Guidance, the allowance rate appears to be improving and at least from direct experience anecdotally improving dramatically in some

quarters (although in fairness we have some fairly robust disclosures with a lot of technical detail and improvement arguments present which are ripe to benefit from the changes and may not be the mean for pending applications). The 2019 Revised SME Guidance has been a watershed event in Art Unit 3600 as the Examiners in Art Unit 3600 are universally acknowledging the subject matter eligibility bar is lower. While it still may take a little bit more patience and hard work than in other art units including more amendments and details than similar cases in other art units, the path forward to allowance is not as grim as it once was in Art Unit 3600 as a whole. Over time however, some art units and maybe more significantly some Primary Examiner's teams appear to have watched the PTAB decisions and been re-emboldened to their more challenging ways so it remains relevant to try and avoid 3600 if you can for the most conservative path. In other art units you may also see 101 rejections and the same techniques will apply, but the process is typically much simpler and more straightforward.

In terms of what the 101 rejections being issued look like, in our experience the rejections tend to generalize an entire claim and abstract the concept to find a judicial exception under Step 2A, first prong. While in theory this should be more challenging given the more limited set of categorizes available to the Examiners under the 2019 Revised SME Guidance, in practice we are not seeing much change over earlier guidance in terms of the ability of an Examiner to find an abstract idea present. This is not entirely shocking given the tendency of Examiners to apply the "broadest" (not necessarily reasonable) interpretation to the claims. After all, when viewed at a high enough level, most claims that wind up being examined in Art Unit 3600 can be found to recite an abstract idea. The rejections typically find all of the claim elements except the computer components as reciting the abstract idea such that the only additional elements remaining for the Step 2A, second prong analysis are the computer components, which the rejection dismisses as no more than mere instructions to apply the exception using generic computer components.

In regard to Step 2B, the 101 rejections tend to gloss over the significantly more prong by stating the individual elements do not amount to significantly more and the combination adds nothing more than the individual elements, without truly looking at each individual element, much less the combination of elements. Further, the 101 rejections tend to state that the additional elements considered at Step 2B are merely "well-understood, routine, and conventional" without providing the evidentiary support required as a result of *Berkheimer*.

In regard to particular prosecution recommendations, for Step 2A, first prong, make sure the broadest reasonable interpretation being set forth in the rejection is correct with respect to the claim elements. Note that this line of argument may not gain as much traction with an Examiner and applicants may have more success with this type of argument on appeal. Also, confirm that the claims recite subject matter that falls within one of the groupings of abstract ideas listed in the 2019 Revised SME Guidance.

For Step 2A, second prong, argue that the claims integrate the alleged abstract idea into a practical application. In particular, argue that the claims encompass a particular embodiment or set of embodiments implementing a specific, optimized IT approach to deliver a desired result. Also, find ways to illustrate that the claims are not merely a drafting effort to monopolize the exception, but in fact clearly limit to specific implementation choices, which distinguish alternative approaches to accomplishing the identified abstract idea. If there is an improvement to the functioning of the computer, argue it as Examiners particularly like this factor to illustrate the integration into a practical application. If possible, analogize your case to the new examples. If an Examiner dismisses the additional elements as being well-

understood, routine, and conventional at Step 2A, second prong, cite the 2019 Revised SME Guidance, which expressly prohibits this.

In regard to Step 2B, if the Examiner dismisses the additional elements as being well-understood, routine, and conventional at this step, request evidence and cite *Berkheimer*. While we continue to argue Step 2B, we note that there is significant overlap between the factors that can illustrate a practical application outlined in the 2019 Revised SME Guidance and the factors previously set forth that can illustrate "significantly more." Given the overlap, there tends to be some redundancy between the arguments we set forth for Step 2A, second prong and the arguments we set forth for Step 2B. Since a number of considerations have been moved up for earlier consideration at Step 2A, second prong, we are having more success at overcoming 101 rejections at Step 2A. This is a marked shift from prior to the 2019 Revised SME Guidance where we had most of our success at Step 2B.

B.   Prosecuting Applications in an Art Unit Outside of 3600

If an application you are prosecuting ends up in an art unit outside of 3600, the chances of overcoming an asserted 101 rejection increase dramatically. If you face a 101 rejection in an art unit other than 3600, applicants should consider using the streamlined analysis if applicable.   As discussed above, the streamlined analysis can be used when the claims clearly do not seek to tie up the judicial exception. To play it safe, in case you have an Examiner unsure or wary about the streamlined analysis, we recommend including an argument under Step 2A, second prong illustrating that the abstract idea is integrated into a practical application.

C.   Interview the Case Regardless of the Art Unit

Regardless of where an application lands, given that what is successful in overcoming a 101 rejection is often case specific and Examiner specific, applicants should conduct interviews to determine potential resolutions.   Interviews can identify potentially eligible language, potentially allowable subject matter, and/or any roadblocks. While we have always interviewed cases telephonically on a regular basis, with the continuing challenges of section 101 we have found that interviewing in-person is another excellent hook in the weapons locker (although not so much recently due to COVID). WebEx videoconference interviews have proven during COVID to be a good alternative to the in-person interview. As noted above, we are gaining insight from the interactions about the cases themselves and about the Examiners' view of the world as a whole. It is a simpler matter to extend a discussion past the case at hand when sitting across the table from an Examiner (or even in one of the video rooms at the main and satellite offices of the USPTO which are the next best thing to being there with remote Examiners). I strongly believe that the relationships built through these face-to-face interviews aid in developing our understanding of how different parts of the Office are struggling with these challenges much as we are and the insights are useful for ideas on how to overcome them. In the opening, we discussed a conversation I had with a Primary who felt completely independent of the guidance – it certainly informed our future advice with the client on dealing with that Examiner. At the same time, the use of that discussion in discussions with other Examiners allows us the chance to quietly lobby the hearts and minds of the Examiners for the benefits of having a structure and analyzing within the structure rather than merely working off of a "gut feeling" about abstractness.

D. Final Prosecution Thoughts and a Warning about the Board-of Appeals

We have had several decisions from the Board affirming the Examiner's 101 rejections. The Board in each of the decisions merely pays lip service to the 2019 Revised SME Guidance. For example, they cite and discuss the new guidance, but they do not actually apply the new guidance the way we are seeing the Examiners apply it. Instead, the Board in each of the decisions paints the limitations of the claims with a broad brush and then dismisses them as well-understood, routine, and conventional very much reminiscent of how the Examiners were applying 101 prior to the 2019 Revised SME Guidance. While Examiners are precluded under Step 2A, second prong from considering whether an element is well-understood, routine, and conventional, in some of the earlier decisions, the Board was not.

We also note that in each of the decisions, the Board confirmed their finding of a recitation of an abstract idea at Step 2A, first prong with citations to the specification that support their alleged category of abstract idea. At Step 2A, second prong, the Board in each of the decisions classifies almost all of the elements as abstract such that the only remaining elements in the claims that are not abstract are generic computer components recited at a high level of generality. The Board then tends to find that the additional elements merely apply the abstract idea using a computer and do not integrate the abstract idea into a practical application. At Step 2B, the Board in each of the decisions finds that the claim elements recited are well-known, routine and conventional, and therefore there is no inventive concept.

In what we hope is an outlier of a decision, we even had one Board state that the improvement we expressly discuss in the specification is not persuasive because our specification did not explain why it was an improvement (and even more disturbing our specification in fact did explain why it was an improvement). We find the decisions from the Board alarming particularly in light of the 2019 Revised SME Guidance and the marked different in how that guidance is being applied by the Examiners. A conservative answer at the moment would be to work harder to focus on a successful outcome with the Examiner rather than counting on help from the Board of Appeals at this time. Given the decisions we have seen to date, we would suggest proceeding with caution when taking cases to appeal.

In one bright note, in one of our first cases to come back from appeal (briefed before the new Guidance but decided after it) where the above short shrift was given and the appeal was lost, we went back to the Examiner and set up our amendments and arguments expressly under the new Guidance (where we had a very robust spec allowing us to do so). We made no headway with the Examiner (single digit allowance rate so we are not alone), but we took the same case back to the Board and argued the new Guidance vociferously and thoroughly. We just received a complete reversal based on those arguments immediately prior to the 2021 AIPLA Annual Meeting – so all is not lost at the Board. However, to get to that point in the key claim the Board discussed we expressly claimed the benefit produced by the novel and non-obvious IT implementation and that carried the day (which arguably we should not have to do). But they did look to the new Guidance, gave it weight, and reversed a pernicious Examiner in a challenging space. SO while we still think the sledding is rough – all hope is not lost if you have to appeal. Of course, with more data this decision itself may turn out to be the outlier.

While overall allowance rates out of 3600 are much lower in a post Alice world, we have seen the pendulum slowly move back towards the applicants as the guidance and their

updates have come out, giving the applicant more of a shot at overcoming an asserted 101 rejection. In the last two years, in large part because of the 2019 Revised SME Guidance, we have also seen more Examiners willing to try to find a path forward to overcome an outstanding 101 rejection. We are hopeful this trend will continue, but will nevertheless continue standing our ground on the patent subject matter eligibility of rejected claims in person, on video, by phone, and in writing using the suggestions discussed above.

VII. EPO & USPTO Takeaways

A. An EPO Counterpoint on Drafting Practices

- US and European best drafting practice is very consistent:

- We must tell our story within the patent specification – explaining how new features solve technical problems ("how the differences make a difference").

- For European success, it is helpful to: identify technical problems and describe the features (and interactions between claim features) which contribute to solving the problems and provide technical effects/advantages. All features which contribute to technical effects are considered when assessing inventive step.

- EPO case law & Guidelines provide helpful examples of technical features and technical effects.

- The boundary between eligible vs ineligible is clearer in Europe than US.

- The specification must include sufficient information for the invention to be worked by a skilled person or team.

- Ask inventors to explain implementation details that solve technical problems, and not only high-level functionality ("technical invention within the invention").

B. Patentable Subject Matter Takeaways EPO Version

- For ML/AI & computer simulation:
    - Describe inputs – e.g. measuring parameters or otherwise selecting/generating a set of training data for training an AI system to determine weighting values of a neural network.
    - Describe outputs – e.g. control signals and applications in the real world – provide basis for claims that are functionally limited to a technical purpose when this is possible
    - Describe processing and communications steps.

- Claims may need features of the technical implementation (where method takes account of the constraints and capabilities of computer system/network) for satisfy requirement for technical character, especially in absence of real world interactions.

- For all computer-implemented inventions, tell a complete story in the specification about the technical problems and all the technical features that contribute to solving the problem. For AI/ML, ensure result is replicable from specification.

- This helps with patent eligibility, inventive step and sufficiency:
    - EPO requires technical effects / technical character for patent eligibility and for inventive step (Article 52(2) and Article 56 EPC);
    - EPO strictly rejects any subject matter added after filing (Art 123(2) EPC)
    - EPO has been raising more insufficiency objections in last 2 years (Art 83 EPC)

- EPO examiners will only allow amendments that are directly and unambiguously derivable from the as-filed specification, and are much more receptive to inventive step arguments that are based on the specification.

C. *Patentable Subject Matter Takeaways USPTO Version*
- Tell your story in the specification and tell it again in interviews.

- There is significant value in having key distinctive claim elements which are tied in by the story as being part of the advantages or solution.

- The claims can't be too broad, or preempt the entire judicial exception, or capable of being performed in the mind of a human.

- Unless the claims are directed to a computer itself, there should be a real world impact—this may provide benefit even if strictly in the specification or in the pre-amble and not an express element of the claim itself.

- In the absence of real world impact, expressly use your story to bring out how the solution is rooted in computer technology or improves computer efficiency or addresses computer centric challenges with computer centric solutions (technical problem/technical solution).

- The story should be about more than money or business operations (i.e., entrepreneurial pursuits) – affects breadth and USPTO classification.

VIII. Conclusions
A. Next steps

We applaud the efforts of patent offices around the world to publish examples of patent eligible claims. This work is ongoing.

On 28 October 2021, just as AIPLA is discussing patent eligibility at its annual meeting, the Guidelines working party of SACEPO (the Standing Advisory Committee before the EPO) will be reviewing a draft update to their Guidelines for Examination, as they work towards publication in February 2022. The current draft includes amendments prompted by G1/19 and includes an example of a patent eligible claim to an application of AI. In parallel with this work, the UKIPO is working on its own examples of claims to AI-related inventions, and is planning its next consultation on AI and IP. We hope to be able to update you on these initiatives by February 2022. Meanwhile, we will continue monitoring EPO cases that reference G1/19 while working on patentability of AI and computer simulation inventions, and we will do our best to help the EPO and UKIPO to develop clear guidelines with additional examples that reflect the relevant case law. We welcome recommendations and questions from AIPLA members.

B. Wrap-up

In the US, the storm appears to have quieted and the waters calmed; and the main European news in 2021 is guidance on which of the established principles and existing case law should be followed in future. However, we admit that we are not sure where things will ultimately land in the US and if and when they do find a stable point (as it appears we may have found one for now) how long they will stay there. Living through what we have been through to date and watching the weather form and stream around us, we are continually reminded of the importance of preparing detailed patent specifications that fully describe how each invention addresses technical problems. These are the patent applications that are most likely to succeed in multiple jurisdictions regardless of any potential changes in the sea. When waters are perfectly calm, you may be able to get by crossing a river in a rowboat, but rowboats do not fare well when we try to cross the Atlantic Ocean and file at the EPO. For an Atlantic crossing and to be confident in any seas, your ship needs to be more sturdily built. In this area of practice, although the waters appear to be calmer in the US at the moment, we need to be prepared for potential changes in the weather and prepared for foreign seas, and to best help our clients we have to help them build sturdier, more seaworthy craft.

We do feel that we can look at the patterns and gauge how best to prepare ourselves for many of the most likely eventualities. There are many opportunities for us to truly add value as patent attorneys as compared to being mere scriveners of a commodity product. We can bring creativity to the discussion in helping inventors better understand and convey more aspects and depth of their inventive contribution. We can bring creativity to the drafting in artfully weaving together the stories in a careful way to support and enhance the structures and methods we are working to protect. We can bring creativity to the discussions and response we have with Examiners to help them understand and to find ways to craft the claims from disclosures that may be less than we would now want them to be. We are able to practice the art of patent lawyering to better help our clients. It's why we picked this profession in the first instance and why we still love what we do today. The good news is that there are more routes to pass through these calmer US waters than there were in the 101 storm we endured for the last several years, and we get the opportunity to find and follow them to navigate the

way for our clients. To paraphrase the poem Invictus: We remain the masters of our fate and the captains of our souls.

Good sailing to you all! We look forward to sharing a drink with you in the next port where we can swap stories about our adventures on the current seas. Cheers!

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