

PRECEDENTIAL OPINION

Pursuant to the Board of Patent Appeals and Interferences Standard Operating Procedure 2, the opinion below has been designated a precedential opinion.

UNITED STATES PATENT AND TRADEMARK OFFICE

**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Ex parte MICHAEL C. NEHLS, BRIAN ZAMBROWICZ, and
ARTHUR T. SANDS

Appeal 2007-1823
Application 09/563,817
Technology Center 1600

Decided: January 28, 2008

Before MICHAEL R. FLEMING, *Chief Administrative Patent Judge*,
DONALD E. ADAMS, ERIC GRIMES, LORA M. GREEN,
NANCY J. LINCK, FRANCISCO C. PRATS, and
JEFFREY N. FREDMAN, *Administrative Patent Judges*.

Opinion for the Board filed by *Administrative Patent Judge* GRIMES.

Opinion Concurring filed by *Administrative Patent Judge* GREEN.

Opinion Concurring filed by *Administrative Patent Judge* ADAMS.

GRIMES, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 involving claims to a computer-based system for comparing nucleic acid sequences. The Examiner has rejected the claims for lack of patentable utility and obviousness. We have jurisdiction under 35 U.S.C. § 6(b). We affirm.

STATEMENT OF THE CASE

The Specification discloses “nucleic acid sequences that partially define the scope of human exons” (Spec. 1). These one thousand sequences, referred to generically as “gene trapped sequences” or GTSSs, are shown in SEQ ID NOS 9 to 1008 (*id.* at 2: 28-32). The Specification states that the GTSSs were isolated using a technique (“gene trapping”) that was designed to specifically isolate parts of exons (*id.* at 6-7, 105-113). Since exons are the protein-encoding parts of genes, each of the disclosed sequences would be expected to encode part of a protein that is expressed in human cells.

Claims 13 and 14 are the only claims pending and read as follows:

13. A computer-based system for identifying nucleic acid fragments of the human genome of commercial importance comprising the following elements:

- a) a data storage means comprising the sense or antisense sequence of at least 18 contiguous nucleotides of any one of SEQ ID NOS:9-1,008;
- b) search means for comparing a target sequence to each of the sequences of the data storage means of step a) to identify homologous sequence(s); and
- c) retrieval means for obtaining said homologous sequence(s) of step (b).

14. The system of claim 13, wherein said data storage means comprises a combination of nucleic acid sequences comprising SEQ ID NOS:9-1,008.

In response to a restriction requirement, Appellants elected the nucleic acid sequence of SEQ ID NO: 9 for examination (response received May 10, 2001).

The Examiner has rejected claims 13 and 14 under 35 U.S.C. §§ 101 and 112, first paragraph, on the basis that the Specification does not disclose a patentable utility for the claimed computer system comprising SEQ ID NO: 9 in its data storage means. The Examiner has also rejected claims 13 and 14 under 35 U.S.C. § 103 as obvious in view of Altschul.¹

Appellants have not argued the claims separately. We therefore focus our analysis on claim 13. Claim 14 will stand or fall with claim 13. 37 C.F.R. § 41.37(c)(1)(vii).

UTILITY UNDER §§ 101 AND 112, FIRST PARAGRAPH

The Utility Issue

Claims 13 and 14 stand rejected under 35 U.S.C. §§ 101 and 112, first paragraph, on the basis that the Specification does not disclose a patentable utility for the claimed computer system comprising SEQ ID NO: 9 in its data storage means. The Examiner's position is:

While the specification asserts that the computer system is useful in identifying exon splice junction and expressed sequence in a given cell, this is not a substantial utility because further research is clearly needed to determine any real world utility of such an exon splice junction of the sequence, such as any specific link with any diseases. . . .

Furthermore, the polynucleotide itself defined by the sequence of SEQ ID NO:9 which is comprised in the computer system is

¹ Altschul et al., "Basic local alignment search tool," 215 J. Mol. Biol. 403-410 (1990).

not supported by a specific asserted utility because the disclosed uses of the nucleic acid sequence in the specification are not specific and are generally applicable to any nucleic acid.

(Answer 4.)

Appellants respond that “SEQ ID NOS:9-1,008 have a substantial utility because they provide useful information regarding gene expression in teratocarcinoma cells (which can be tracked using gene chips . . .), which mimics gene expression during late stages of stem cell differentiation and development” (Br. 7). Appellants also argue that the polynucleotides of SEQ ID NOs 9-1008 are useful for “assessing gene expression patterns using high-throughput DNA chips” (*id.* at 8) and that the claimed computer system is useful for identifying introns and exons (*id.* at 11-12) and mapping human chromosomes (*id.* at 12-13).

In view of these conflicting positions, we frame the utility issue as follows: Does the Specification disclose a use for the claimed computer system that satisfies the requirements of 35 U.S.C. § 101 and the how-to-use prong of 35 U.S.C. § 112, first paragraph?

Findings of Fact Relating to Utility

1. The Specification discloses 1,000 nucleic acids (Spec. 1; Sequence Listing filed May 3, 2000, SEQ ID NOs 9-1008).
2. The Specification states that the nucleic acids of SEQ ID NOs 9-1008 were derived from protein-encoding parts of human genes (Spec. 6-7, 105-113).
3. The Specification does not disclose any specific human gene as the source of any of the nucleic acids of SEQ ID NOs 9-1008.

4. The Specification does not disclose the amino acid sequence encoded by any of the nucleic acids of SEQ ID NOs 9-1008.

5. The Specification states that the disclosed nucleic acids “typically contain only a portion of the mature RNA transcript . . . , and therefore such clones may only encode a portion of the polypeptide of interest” (Spec. 13: 13-17)

6. SEQ ID NO: 9 is 210 nucleotides long (Sequence Listing filed May 3, 2000).

7. The Specification discloses “methods of analyzing biopolymer . . . sequence information comprising the steps of loading a first biopolymer sequence into or onto an electronic data storage medium . . . and comparing said first sequence to at least a portion of one of the polynucleotide sequences . . . SEQ ID NOS:9-1,008” (Spec. 3: 7-16).

8. The Specification states that a computer system comprising SEQ ID NOs 9-1008 in its data storage medium can be used to identify other nucleic acids having sequences similar to those of the disclosed nucleic acids (Spec. 100-105).

9. The Specification states that the disclosed nucleic acids provide unique tools for diagnostic gene expression analysis, for cross species hybridization analysis, for genetic manipulations using a variety of techniques, like, for example, antisense inhibition, gene targeting, the identification or generation of full-length cDNA, mapping the human genome, gene therapy, gene delivery, etc.
(Spec. 16: 8-24.)

10. The Specification does not disclose uses for any of the nucleic acids of SEQ ID NOs 9-1008 that depend on the structure or physical or

chemical properties of a particular nucleic acid or the peptide encoded thereby.

Discussion of the Utility Issue

Based on our findings and those of the Examiner, we conclude that the Specification does not disclose a utility for the claimed computer system that satisfies 35 U.S.C. §§ 101 and 112, first paragraph.

The U.S. Court of Appeals for the Federal Circuit has held that § 101 requires a utility that is both substantial and specific. *In re Fisher*, 421 F.3d 1365, 1371 (Fed. Cir. 2005). The court held that a substantial utility requires showing that “an invention is useful to the public as disclosed in its current form, not that it may prove useful at some future date after further research. Simply put, to satisfy the ‘substantial’ utility requirement, an asserted use must show that that claimed invention has a significant and presently available benefit to the public.” *Id.*

The court held that a specific utility is “a use which is not so vague as to be meaningless.” *Id.* In other words, “in addition to providing a ‘substantial’ utility, an asserted use must also show that that claimed invention can be used to provide a well-defined and particular benefit to the public.” *Id.*

The court held that the uses asserted by Fisher were not substantial or specific. The uses were not substantial because

the claimed ESTs act as no more than research intermediates that may help scientists to isolate the particular underlying protein-encoding genes and conduct further experimentation on those genes. . . . Accordingly, the claimed ESTs are, in the words of the Supreme Court, mere ‘object[s] of use-testing,’ to wit, objects upon which scientific research could be performed

with no assurance that anything useful will be discovered in the end.

Id. at 1373 (alteration in original). The court concluded that “Fisher’s asserted uses are insufficient to meet the standard for a ‘substantial’ utility under § 101.” *Id.*

“Furthermore, Fisher’s seven asserted uses are plainly not ‘specific.’ Any EST transcribed from any gene in the maize genome has the potential to perform any one of the alleged uses. . . . Nothing about Fisher’s seven alleged uses set the five claimed ESTs apart from the more than 32,000 ESTs disclosed in the ‘643 application or indeed from any EST derived from any organism. Accordingly, we conclude that Fisher has only disclosed general uses for its claimed ESTs, not specific ones that satisfy § 101.” *Id.* at 1374.

Here, the claimed computer system is disclosed to be useful for identifying nucleic acids that are similar to SEQ ID NOs 9-1008 (Finding of Fact (“FF”) 8). The utility of the claimed computer system therefore depends on the utility of the nucleic acids of SEQ ID NOs 9-1008: if the disclosed nucleic acids lack utility, so do nucleic acids similar to them and a computer system for identifying such similar nucleic acids.²

² The preamble of claim 13 states that the computer system is for identifying nucleic acids “of commercial importance.” This recitation does not impart patentable utility on the claimed computer system, for two reasons. First, the body of the claim only requires means for comparing a target sequence to those of SEQ ID NOs 9-1008; the computer system defined by the claim provides no means for distinguishing nucleic acids of “commercial importance” from others. *See IMS Technology, Inc. v. Haas Automation, Inc.*, 206 F.3d 1422, 1434 (Fed. Cir. 2000) (“If the preamble adds no limitations to those in the body of the claim, the preamble is not itself a

The uses asserted in the Specification for the disclosed nucleic acids (*see* FF 9) are not “substantial” or “specific,” as those terms were defined by the *Fisher* court. They are not substantial because, like the ESTs claimed in *Fisher*, the GTSs represented by SEQ ID NOs 9-1008 are “no more than research intermediates that may help scientists to isolate the particular underlying protein-encoding genes and conduct further experimentation on those genes.” *Fisher*, 421 F.3d at 1373. Accordingly, the GTSs represented by SEQ ID NOs 9-1008 are merely “objects upon which scientific research could be performed with no assurance that anything useful will be discovered in the end.” *Id.* The uses asserted for the GTSs represented by SEQ ID NOs 9-1008 therefore do not meet the standard for a substantial utility under § 101.

Nor are they specific utilities, because they could be asserted for any partial cDNA transcribed from any gene in the human genome. Because nothing about Appellants’ asserted utilities sets the nucleic acids of SEQ ID NOs 9-1008 apart from any other human cDNA fragment, Appellants have only disclosed general uses for the disclosed GTSs, not specific ones that satisfy § 101. *See id.* at 1374.

claim limitation and is irrelevant to proper construction of the claim.”). Second, the Specification does not describe the “commercial importance” of the identified nucleic acids in a way that would allow those skilled in the art to put them to a specific and substantial use. *Cf. In re Kirk*, 376 F.2d 936, 941 (CCPA 1967) (“[T]he nebulous expressions ‘biological activity’ or ‘biological properties’ appearing in the specification convey no more explicit indication of the usefulness of the compounds and how to use them than did the equally obscure expression ‘useful for technical and pharmaceutical purposes’ unsuccessfully relied upon by the appellant in *In re Diedrich*, 50 CCPA 1355, 318 F.2d 946, 138 USPQ 128.”).

Appellants have provided no persuasive explanation why those skilled in the art would find gene expression data from teratocarcinoma cells to be useful, as that term was defined by the *Fisher* court. Nor have Appellants rebutted the Examiner's reasoning, and the reasoning we rely on above, by showing that any of the uses asserted in the Specification or in the Appeal Brief is both "substantial" and "specific."

We therefore affirm the rejection of claims 13 and 14 under 35 U.S.C. §§ 101 and 112, first paragraph, for lack of patentable utility.

Our concurring colleagues fault us for focusing on the specific SEQ ID NOs recited in the claims when considering utility, but concluding (*see infra*) that those same SEQ ID NOs do not patentably distinguish the claimed computer system from the prior art. We see no impropriety in our approach. The claims are directed to a computer system "for identifying nucleic acid fragments of the human genome of commercial importance" based on a comparison to SEQ ID NOs 9-1008. The claimed system requires no functionality other than that required to compare a target sequence to SEQ ID NOs 9-1008 and output the result. Therefore, it is entirely proper to limit the utility analysis to the usefulness of the nucleic acids represented by SEQ ID NOs 9-1008, even if the sequences themselves do not distinguish the claimed computer system from the prior art.

OBVIOUSNESS UNDER § 103

The Obviousness Issue

The Examiner finds that Altschul discloses a computer system that "differ[s] from the claimed invention only in the content of the nucleic acid

comprised in the storage of the computer system” (Answer 6). The

Examiner reasons that

the sequence of a fragment of SEQ ID NO:9, or a combination of the sequences of SEQ ID NOS: 9-1008, constitutes non-functional descriptive material because the content of the nucleic acid sequence database does not alter how the computer system functions, i.e., the database of the claimed computer system does not reconfigure the computer system to perform a different function than the computer system of Altschul et al. Therefore, no patentable weight is given to the content of the database on the claimed computer system.

(*Id.* at 7.)

Appellants argue that “the difference between Altschul and the present invention, specifically SEQ ID NO:9, is not ‘non-functional descriptive material’” (Br. 18-19).

In view of these conflicting positions, we frame the § 103 issue as follows: Does the claimed computer system differ from the prior art computer system in a nonobvious way; i.e., in more than the content of nonfunctional descriptive material?

Findings of Fact Relating to Obviousness

11. Altschul discloses a computer system that compares target nucleic acid sequences to those in a database. (Altschul 403 (abstract): “The basic algorithm . . . can be implemented in a number of ways . . . including straightforward DNA and protein sequence database searches.”)

12. Altschul’s Table 2 shows the time required for “searching the PIR database (Release 23•0) with a random query sequence of length 250 using a SUN4-280” (Altschul 408).

13. Appellants do not dispute that Altschul teaches a computer system comprising a data storage means, “search means for comparing a target sequence to each of the sequences of the data storage means . . . to identify homologous sequence(s),” and “retrieval means for obtaining said homologous sequence(s).”

14. Altschul does not disclose that the database used in the disclosed computer system included at least eighteen contiguous nucleotides of SEQ ID NOs 9-1008 of the instant application.

15. The computer system defined by claim 13 differs from Altschul only in the content of the data storage means: claim 13 requires that the data storage means comprises “the sense or antisense sequence of at least 18 contiguous nucleotides of any one of SEQ ID NOS:9-1,008,” which Altschul does not disclose.

Discussion of the Obviousness Issue

Based on our findings and those of the Examiner, we conclude that the particular sequence data recited in claim 13 is nonfunctional descriptive material and does not distinguish the claimed computer-based system from the prior art system that is the same except for its sequence data.

The distinction between functional and nonfunctional descriptive material arose in the context of printed matter limitations. For example, in *In re Gulack*, 703 F.2d 1381 (Fed. Cir. 1983), printed matter that was functionally related to its substrate was held to distinguish the claimed product from the prior art. In *Gulack*, the claims recited “three key elements: (1) a band . . .; (2) a plurality of individual digits imprinted on the band or ring at regularly spaced intervals; and (3) an algorithm by which the

appropriate digits are developed.” *Id.* at 1382. With the digits generated by the algorithm printed on it, the band could be used “to perform magic tricks or to display various aspects of number theory.” *Id.* at 1383. The claims had been rejected as obvious, based on prior art that differed only in what was printed on the band. *Id.* at 1384.

The court stated that, although limitations reciting printed matter cannot be ignored, “[w]here the printed matter is not functionally related to the substrate, the printed matter will not distinguish the invention from the prior art in terms of patentability. Although the printed matter must be considered, in that situation it may not be entitled to patentable weight.” *Id.* at 1385 (footnote omitted). The “critical question is whether there exists any new and unobvious functional relationship between the printed matter and the substrate.” *Id.* at 1386. The *Gulack* court held that such a relationship had been shown: the looped structure of the substrate and the particular digits printed on it interrelated to give the claimed product a property it would not have had if either the structure or the digits were changed. Therefore, the content of the printed matter was held to produce a nonobvious difference between the claimed product and the prior art.

By contrast, in *In re Ngai*, 367 F.3d 1336 (Fed. Cir. 2004), a printed matter limitation was held to be nonfunctional and therefore inadequate to distinguish the claimed product from the prior art. Ngai claimed a kit that contained at least one of several reagents (e.g., buffer) and instructions that described a process of using the reagents to amplify RNA. *Id.* at 1337. The claim had been rejected based on prior art that disclosed a kit containing buffer and instructions that described a different process. *Id.*

The *Ngai* court held that the printed instructions were not related to the claimed kit in the way that Gulack's numbers were related to his band. *See id.* at 1339: "In *Gulack*, the printed matter would not achieve its educational purposes without the band, and the band without the printed matter would similarly be unable to produce the desired result. Here, the printed matter in no way depends on the kit, and the kit does not depend on the printed matter. All that the printed matter does is teach a new use for an existing product." The rejection was affirmed.

A similar distinction has been recognized in the context of computer-related inventions. Compare *In re Warmerdam*, 33 F.3d 1354 (Fed. Cir. 1994), with *In re Lowry*, 32 F.3d 1579 (Fed. Cir. 1994). Both cases involved so-called "data structures." The court in *Warmerdam* concluded that the claimed "data structure" was not a physical arrangement of hardware but instead was "nothing more than another way of describing the manipulation of ideas contained in" other claims and therefore not statutory subject matter eligible for patenting. 33 F.3d at 1362. The *Lowry* court, however, concluded that the claimed data structures were "physical entities that provide increased efficiency in computer operation" and were not analogous to printed matter. 32 F.3d at 1584.³

³ Judge Adams notes that the *Lowry* court stated that the "printed matter cases have no factual relevance where 'the invention as defined by the claims requires that the information be processed not by the mind but by a machine, the computer'" (*post* at 43). That statement, however, must be regarded as dictum, because the court went on to conclude that the data structures at issue in *Lowry* were not analogous to printed matter. *See* 32 F.3d at 1584. Thus, the quoted statement was not essential to the *Lowry* holding. The *Lowry* court did not consider whether, and under what

Here, the descriptive material (SEQ ID NOs) recited in the claims is not functional material like the data structures in *Lowry*. There is no evidence that SEQ ID NOs 9-1008 functionally affect the process of comparing a target sequence to a database by changing the efficiency or accuracy or any other characteristic of the comparison. Rather, the SEQ ID NOs are merely information being manipulated by a computer; the SEQ ID NOs are inputs used by a computer program that calculates the degree of similarity between a target sequence and each of the sequences in a database.⁴ The specific SEQ ID NOs recited in the claims do not affect how the method of the prior art is performed – the method is carried out the same way regardless of which specific sequences are included in the database.⁵

Thus, the descriptive material in this case is properly considered to be nonfunctional. The SEQ ID NOs recited in the claims are analogous to the instructions in *In re Ngai*. The *Ngai* court held that, in contrast to *Gulack*, the printed instructions were not functionally related to the claimed kit. *See Ngai*, 367 F.3d at 1339: “In *Gulack*, the printed matter would not achieve its

circumstances, computer-readable information that *is* analogous to printed matter can distinguish a claimed invention from the prior art.

⁴ Similarly, a claim to a computerized system for searching a phonebook placed in a database would not be patentable, absent some novel and nonobvious characteristic of the computer hardware or search tools.

⁵ Of course, the results of comparing a target sequence to a database may change depending on which sequences are included in the database. That possibility does not mean that the database sequences are functional: MP3 files encoding different songs will cause a computer’s speaker to output different music, but music is a paradigmatic nonfunctional descriptive material. Descriptive material is not functional merely because it results in different outputs when acted on by a computer program.

educational purposes without the band, and the band without the printed matter would similarly be unable to produce the desired result. Here, the printed matter in no way depends on the kit, and the kit does not depend on the printed matter.” The same is true here. The recited sequences are not functionally related to the computer system carrying out the comparison because the computer compares a target sequence to a database the same way regardless of whether the database includes any of SEQ ID NOs 9-1008: the SEQ ID NOs and the computer do not depend on each other for their function.

Other panels of this Board have reached the same conclusion with respect to computer-implemented methods. *See Ex parte Curry*, 84 USPQ2d 1272 (BPAI 2005), *aff'd* (Fed. Cir. Appeal No. 2006-1003, *aff'd* Rule 36 June 12, 2006) and *Ex parte Mathias*, 84 USPQ2d 1276 (BPAI 2005), *aff'd* 191 Fed.Appx. 959 (Fed. Cir. 2006). The Board in *Curry* held that a computer-implemented method of providing “wellness-related services” would have been obvious, even though the specific wellness-related data were not taught or suggested by the cited prior art. According to the Board, “the ‘wellness-related data in the databases . . . does not functionally change either the data storage system or communication system used in the method of claim 81. Nonfunctional descriptive material cannot render nonobvious an invention that would have otherwise been obvious.” 84 USPQ2d at 1274.

Similarly, the Board in *Mathias* held unpatentable a claim to an “on-screen icon for viewing the score of a broadcast sporting event,” even though the cited prior art did not teach or suggest a sporting event in this context. The Board noted that “our reviewing court has held that

nonfunctional descriptive material,” such as the sporting event, “cannot lend patentability to an invention that would have otherwise been anticipated by the prior art.” 84 USPQ2d at 1278-79.

In both these cases, as here, a computer was used to facilitate manipulating information that previously would have been manipulated by less efficient means, for example, manually. In such cases, the nature of the information being manipulated does not lend patentability to an otherwise unpatentable computer-implemented product or process.

Our conclusion is also consistent with the USPTO’s examination guidelines relating to subject matter eligible for patenting. See Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility (“Guidelines”), 1300 Off. Gaz. Pat. Office 142 (November 22, 2005), especially pages 151-152. (The Manual of Patent Examining Procedure includes substantively the same guidance. See MPEP, 8th edition (revised Aug. 2006), § 2106.01.)

The Guidelines state that “‘functional descriptive material’ consists of data structures and computer programs which impart functionality when employed as a computer component. . . . ‘Nonfunctional descriptive material’ includes but is not limited to music, literary works and a compilation or mere arrangement of data.” 1300 Off. Gaz. Pat. Office at 151. When claims comprise nonfunctional descriptive material recorded on computer-readable media, the Guidelines direct the Examiner to

determine whether the claimed nonfunctional descriptive material be given patentable weight. The USPTO must consider all claim limitations when determining patentability of an invention over the prior art. *In re Gulack*, 703 F.2d 1381, 1385, 217 USPQ 401, 403-04 (Fed. Cir. 1983). The USPTO

may not disregard claim limitations comprised of printed matter. *See Gulack*, 703 F.2d at 1384, 217 USPQ at 403; *see also Diehr*, 450 U.S. at 191, 209 USPQ at 10. However, the examiner need not give patentable weight to printed matter absent a new and unobvious functional relationship between the printed matter and the substrate. *See In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994); *In re Ngai*, 367 F.3d 1336, 70 USPQ2d 1862 (Fed. Cir. 2004).

(1300 Off. Gaz. Pat. Office at 151-152.)

Consistent with the Guidelines, the Examiner in this case considered all of the limitations of the claims but declined to give patentable weight to those limitations reciting nonfunctional descriptive material; specifically, SEQ ID NOs 9-1008.

Appellants argue, however, that “the MPEP details that non-functional descriptive material is not patentable (‘(t)he policy that precludes the patenting of nonfunctional descriptive material would be easily frustrated if the same descriptive material could be patented when claimed as an article of manufacture’ (MPEP at 2100-14 (emphasis added)). As . . . nucleic acids are patentable, this also supports the position that SEQ ID NO:9 is functional descriptive material.” (Br. 19-20.)

This argument is unpersuasive. Nucleic acids are patentable, but SEQ ID NO: 9 is not a nucleic acid – it is an abstract representation of the structure of a nucleic acid. That is, nucleic acids are not made up of A’s, T’s, G’s, and C’s, the way SEQ ID NO: 9 is; nucleic acids are chemical entities made up of the bases adenine, thymine, guanine, and cytosine, connected to sugar residues, which in turn are connected by phosphodiester bonds. The *compound* represented by SEQ ID NO: 9 may be patent-eligible subject matter, but SEQ ID NO: 9 itself is not. The potential patentability of

the compound represented by SEQ ID NO: 9 does not support Appellants' position that SEQ ID NO: 9 is functional descriptive material.

As further support for their position that the recited SEQ ID NOs should be sufficient to distinguish the instant claims from the prior art, Appellants point to issued patents that include a "comparison function" such as patents involving the use of passwords to allow a user access to a computer and computer virus scanning programs. Appellants reason that "[i]n these and similar patents, the computer compares an input to authorized passwords or known computer viruses, in the same way that the present computer system compares an input sequence to a biologically verified coding sequence (in this case, SEQ ID NO:9)." (Br. 20.)

This argument is also unpersuasive. It is undisputed that the instant claims differ from the prior art only in the content (i.e., SEQ ID NO: 9) that is being compared in the claimed computer system. Appellants have not alleged that the patents cited in the Appeal Brief claim products or methods that differ from the prior art only in the content (password or computer virus) that is compared in the performance of the claimed security or virus-scanning program. Since the inventions claimed in the cited patents apparently differ from the prior art in more than the mere content of the data being compared, the cited patents do not support the patentability of the instant claims.

The concurrences believe that we have improperly disregarded the SEQ ID NO limitation of claim 13 (*post* at 21, 45-46). The concurrences misinterpret our reasoning and set up a false dichotomy between utility and obviousness. We have not disregarded the SEQ ID NO claim limitation.

The claimed computer system requires the recited SEQ ID NOs, but not every claim limitation suffices to distinguish a claimed invention from the prior art. In this case, we conclude that the particular SEQ ID NOs recited in claim 13 do not patentably distinguish the claimed computer system from a prior art system that is otherwise identical.

Our concurring colleagues would hold that the SEQ ID NOs recited in claim 13 patentably distinguish the claimed computer system from the prior art. The logical extension of that conclusion, however, is that putting any new data into the storage medium of a computer creates a nonobvious computer system. In our view, the case law does not support such a rule.

SUMMARY

We affirm the rejection of claims 13 and 14 under 35 U.S.C. §§ 101 and 112, first paragraph for lack of patentable utility. We also affirm the rejection of claims 13 and 14 under 35 U.S.C. § 103.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv) (2006).

AFFIRMED

GREEN, *Administrative Patent Judge, concurring in the result.*

Claim 13, the only independent claim on appeal, reads as follows:

13. A computer-based system for identifying nucleic acid fragments of the human genome of commercial importance comprising the following elements:

- a) a data storage means comprising the sense or antisense sequence of at least 18 contiguous nucleotides of any one of SEQ ID NOS:9-1,008;
- b) search means for comparing a target sequence to each of the sequences of the data storage means of step a) to identify homologous sequence(s); and
- c) retrieval means for obtaining said homologous sequence(s) of step (b).

The only limitation focused on by the Majority is element a)—a data storage means comprising the sense or antisense sequence of at least 18 contiguous nucleotides of any one of SEQ ID NOS:9-1008. In particular, the Majority focuses on the limitation drawn to the sense or antisense sequence of at least 18 contiguous nucleotides of any one of SEQ ID NOS:9-1008, with SEQ ID NO:9 being drawn to the nucleic acid sequence elected by Appellants for examination (response received May 10, 2001).

In affirming the Examiner's rejection under 35 U.S.C. § 101, on the basis that the Specification does not disclose a patentable utility for the claimed computer system comprising SEQ ID NO:9 in its data storage means, the Majority focuses on the lack of utility for a nucleic acid of SEQ ID NOs 9-1008 (Majority Op. 3-9). Specifically, the Majority finds that the utilities asserted in the Specification are not substantial "because, like the ESTs claimed in *Fisher*, the GTSs represented by SEQ ID NOs 9-1008 are 'no more than research intermediates that may help scientists to isolate the

particular underlying protein-encoding genes and conduct further experimentation on those genes.”’ (*Id.* at 8, quoting *In re Fisher*, 421 F.3d 1365, 1373 (Fed. Cir. 2005).) The Majority also finds that the asserted utilities are not specific “because they could be asserted for any partial cDNA transcribed from any gene in the human genome.” (Majority Op. at 8.) In affirming the rejection of the claims under 35 U.S.C. § 103(a), however, the Majority concludes that “the particular sequence data recited in claim 13 is nonfunctional descriptive material and does not distinguish the claimed computer-based system from the prior art system that is the same except for its sequence data.” (Majority Op. 11.)

Thus, the Majority focuses primarily on the sequence limitations in finding that the invention of claim 13 lacks patentable utility, and not on the computer-based system for identifying nucleic acid fragments. In addressing the rejection under 35 U.S.C. § 103(a), however, the Majority refuses to consider the sequence limitations in determining the patentability of the claim over the prior art rejection, concluding that the sequence limitations are drawn solely to “nonfunctional descriptive material” that “does not distinguish the claimed computer-based system from the prior art system that is the same except for its sequence data.” (Majority Op. 10.)

The position of the Majority is inconsistent. It is unfair to Appellants to rely primarily on the sequence data to find that the claims do not meet the utility requirement of 35 U.S.C. § 101, and then state that the sequence data are only nonfunctional descriptive material that does not contribute to the patentability of the claim under 35 U.S.C. § 103(a). Which is it? *See, e.g., In re Nuijten*, 500 F.3d 1346, 1366 (Fed. Cir. 2007) (Linn, concurring-in-

part and dissenting-in-part) (noting that “[a]bsent *Lowry*, the PTO’s position apparently would be that Nuijten’s claim 14 (the signal, standing alone) is unpatentable subject matter under § 101, and that claim 15 (the storage medium containing the signal) is unpatentably obvious under § 103 over prior art storage media. The PTO’s position makes little sense. As a doctrinal matter, the PTO should not look to § 101 sometimes and § 103 at other times to accomplish the same end.” (footnote omitted).)

I agree with the Majority’s analysis under 35 U.S.C. § 101 that the claimed SEQ ID NOs do not have patentable utility, and thus concur in the result. I do not agree, however, that the SEQ IDs are nonfunctional, descriptive subject matter, which should not be considered in the obviousness analysis. I thus respectfully dissent as to the Majority’s opinion as to the obviousness analysis.

“The Patent and Trademark Office . . . must consider all claim limitations when determining patentability of an invention over the prior art.” *In re Lowry*, 32 F.3d 1579, 1582 (Fed. Cir. 1994).

Differences between an invention and the prior art cited against it cannot be ignored merely because those differences reside in the content of the printed matter. Under section 103, the board cannot dissect a claim, excise the printed matter from it, and declare the remaining portion of the mutilated claim to be unpatentable. The claim must be read as a whole.

In re Gulack, 703 F.2d 1381, 1385 (Fed. Cir. 1983) (footnotes omitted).

According to the *Gulack* court, “[w]here the printed matter is not functionally related to the substrate, the printed matter will not distinguish the invention from the prior art in terms of patentability.” *Id.* Thus, the issue is are SEQ ID NOs:9-1008 functionally related to the computer-based

system for identifying nucleic acid fragments. *See, e.g., Lowry*, 32 F.3d at 1582. To determine when printed matter is “functionally related to the substrate” as required by the Court of Appeals for the Federal Circuit requires review of the case law relating to functional and nonfunctional subject matter.

In *In re Miller*, 418 F.2d 1392 (CCPA 1969), the claims at issue were drawn to measuring receptacles “adapted to ameliorate the mental strain on cooks.” *Id.* at 1394. Claim 10 of the application was illustrative, and was drawn to:

A measuring device comprising: a spoon for measuring ingredient; and volume measuring indicia defined in normal volumetric unit on said spoon of a selected ratio to but indicating a volume different from the actual volume of ingredients being added to and measured in said spoon by said indicia, and a legend attached to said spoon specifying said ratio.

Id. at 1395.

The claimed measuring device contemplated not only measuring multiple recipes, but also solved “the greater difficulty of measuring out fractional recipes, such as 1/3 or 1/2.” *Id.* at 1393. The examiner rejected the claims, noting that the claims were defined over any normal measuring receptacle “only by the addition of unpatentable printed matter.” *Id.* at 1395.

The Court of Claims and Patent Appeals reversed, stating:

The fact that printed matter by itself is not patentable subject matter, because non-statutory, is no reason for ignoring it when the claim is directed to a combination. Here, there is a new and unobvious functional relationship between a measuring receptacle, volumetric indicia thereon indicating volume in a certain ratio to actual volume, and a legend indicating the ratio,

and in our judgment the appealed claims properly define this relationship. No question as to novelty or unobviousness of the invention as claimed is before us except with relation to an ‘ordinary measuring vessel.’ By implication, the examiner admits that no such combination exists in or would be obvious from an ordinary measuring vessel and we therefore deem sections 102 and 103 to be satisfied.

Id. at 1396.

In re Gulack, 703 F.2d 1381 (Fed. Cir. 1983) involved claims to a product having “three key elements: (1) a *band*, ring, or set of concentric rings, (2) a plurality of individual *digits* imprinted on the band or ring at regularly spaced intervals; and (3) an *algorithm* by which the appropriate digits are developed.” *Id.* at 1382. Specific embodiments of the band set forth in the specification included “a belt, hatband, headband, skullcap border, necklace, ring, table edge, household device or utensil, jewelry, and other artifacts.” *Id.* The objective of the claimed invention was “to create the semblance of magic or to educate with respect to intriguing aspects of number theory.” *Id.*

In rejecting the claims under § 103, the examiner stated that the appealed claims differed from the prior art only in the specific digits printed on the band, finding “no relationship between appellant’s digits and band except that the band is the surface on which the digits are printed.” *Id.* at 1384. The board, in affirming the examiner’s rejection, “found no meaningful relationship between the digits and the band of the type indicated by the court in *Miller*.” *Id.* The board distinguished *Miller*, noting that the digits printed on the claimed band did not convey any meaningful information with regard to the band, did not require any size relationship of

the substrate, and did not require any particular substrate to convey the information. *Id.* Thus, as understood by the *Gulack* court, the board did not give the printed matter, *i.e.*, the digits, any patentable weight “because the board felt that there is no functional relationship between the printed matter and the substrate.” *Id.*

In finding that there was a functional relationship between the band and the digits printed thereon, the *Gulack* court explained:

A functional relationship of the precise type found by the CCPA in *Miller*—to size or to type of substrate, or conveying information about substrate—is not required. What is required is the existence of *differences* between the appealed claims and the prior art sufficient to establish patentability. The bare presence or absence of a specific functional relationship, without further analysis, is not dispositive of obviousness. Rather, the critical question is whether there exists any new and unobvious functional relationship between the printed matter and the substrate.

Id. at 1386.

Thus, according to the *Gulack* court, the digits were “related to the band in two ways: (1) the band supports the digits; and (2) there is an endless sequence of digits—each digit residing in a unique position with respect to every other digit in an endless loop. Thus, the digits exploit the endless nature of the band.” *Id.* at 1386-87.

In *In re Ngai*, 367 F.3d 1336 (Fed. Cir. 2004), the claim on appeal was drawn to a kit comprising a 10X buffer and instructions on performing a specific method of normalizing and amplifying an RNA population. *Id.* at 1337-38. *Ngai* did not dispute that the prior art taught a kit comprising instructions and a 10X buffer, thus the only difference between the claim

and the prior art was the content of the instructions. *Id.* at 1338. In affirming the rejection of the claim, the *Ngai* Court stated:

This case, however, is dissimilar from *Gulack*. There the printed matter and the circularity of the band were interrelated, so as to produce a new product useful for “educational and recreational mathematical” purposes. Here, addition of a new set of instructions into a known kit does not interrelate with the kit in the same way as the numbers interrelated with the band. In *Gulack*, the printed matter would not achieve its educational purposes without the band, and the band without the printed matter would similarly be unable to produce the desired result. Here, the printed matter in no way depends on the kit, and the kit does not depend on the printed matter. All that the printed matter does is teach a new use for an existing product. As the *Gulack* court pointed out, “[w]here the printed matter is not functionally related to the substrate, the printed matter will not distinguish the invention from prior art in terms of patentability.” . . . If we were to adopt *Ngai*’s position, anyone could continue patenting a product indefinitely provided that they add a new instruction sheet to the product. This was not envisioned by *Gulack*.

Id. at 1339.

In my view, the claims at issue in the instant appeal are much more similar to those in *Miller* and *Gulack* than the claim at issue in *Ngai*. In *Miller*, the court found that there was a “new and unobvious functional relationship between a measuring receptacle, volumetric indicia thereon indicating volume in a certain ratio to actual volume, and a legend indicating the ratio.” 418 F.2d at 1396. In *Gulack*, the digits were “related to the band in two ways: (1) the band supports the digits; and (2) there is an endless sequence of digits—each digit residing in a unique position with respect to every other digit in an endless loop.” 703 F.2d at 1386-87.

Claim 13 is drawn to a computer-based system for identifying nucleic acid fragments comprising: (1) a data storage comprising the sense or antisense sequence of at least 18 contiguous nucleotides of any one of SEQ ID NOS:9-1,008; (2) a search means; and (c) retrieval means. The prior art, Altshul, “differ[s] from the claimed invention only in the content of the nucleic acid comprised in the storage of the computer system.” (Answer 6.)

The nucleic acid sequences of the claim are functionally related to the computer system of the claim, because, as claimed, they can only be accessed and searched through the use of the computer system. In addition, the sequence of the nucleic acid stored is not a random collection of As, Gs, Cs, and Ts. Rather, it is representative of a sequence of nucleic acid found in nature which performs a specific function. Thus, the As, Gs, Cs, and Ts have “unique positions” to one another based on the sequences of the naturally occurring nucleic acids. The specific nucleic acid sequences are integral to the invention being claimed. Thus, there exists any new and unobvious functional relationship between the printed matter and the substrate.

Therefore, the instant situation is not analogous to that in *Ngai*. The rationale in *Ngai* was that the content of instructions, the only difference between the claim at issue and the prior art, only taught “a new use for an existing product.” 367 F.3d at 1339. To “adopt *Ngai*’s position, anyone could continue patenting a product indefinitely provided that they add a new instruction sheet to the product.”

Claim 13 is not an attempt to patent an old product by adding instructions on using the old product in a different way. Rather, if we

assume the nucleic acid sequences are new and non-obvious,⁶ one has a new product. That new product is a computer system comprising a data storage means having the new and non-obvious sequences, with which one can compare a query sequence to those new and non-obvious sequences. Thus, in the instant case, the computer system is more analogous to the measuring vessel of *Miller* or the band of *Gulack*, rather than the instruction sheet of *Ngai*, and the SEQ ID NOs are more analogous to the volumetric indicia of *Miller* or the digits generated by the algorithm of *Gulack* than to the content of the instruction sheet of *Ngai*.

The Court of Appeals for the Federal Circuit's decisions in *In re Lowry*, 32 F.3d 1579 (Fed. Cir. 1994) and *In re Warmerdam*, 33 F.3d 1354 (1994), do not dictate a different result.⁷ The invention in *Lowry* "provides an efficient, flexible method of organizing data in a computer memory." *Id.* at 1580. In affirming the obviousness rejection of the examiner, the board found that the data structures required by the claims were printed matter, and that they did not distinguish the claimed invention from the prior art. *Id.* at 1582. The Federal Circuit, however, found that the data structures were not analogous to printed matter; rather they defined "functional characteristics of the memory." *Id.* at 1583. Thus, according to the court, "[t]he printed matter

⁶ The Examiner did not apply any prior art against the nucleic acids of SEQ ID NOS:9-1008.

⁷ I have considered the Majority's arguments based on *Ex parte Curry*, 84 USPQ2d 1272 (BPAI 2005), *aff'd* (Fed. Cir. Appeal No. 2006-1003, *aff'd* Rule 36 June 12, 2006) and *Ex parte Mathias*, 84 USPQ2d 1276 (BPAI 2005), *aff'd* 191 Fed.Appx. 959 (Fed. Cir. 2006). The fact patterns in those cases are very different from those presented by the instant appeal, and thus the outcomes in those cases have little bearing on the instant appeal.

cases have no factual relevance here.” *Id.* The *Lowry* court went on to state that even if the data objects and data structures are analogous to printed matter, “the ADO’s perform a function. *Gulack* requires no more.” *Id.* at 1584.

The claims at issue in *Warmerdam* were drawn to a method of generating a data structure that represents the shape of a physical object. 33 F.3d at 1357. The board sustained the rejection of the examiner under § 101, finding that a “data structure” is not within one of the categories of patentable subject matter. *Id.* at 1358. The Court of Appeals agreed, and affirmed. *Id.* at 1361. Thus, the holding of *Warmerdam* “is a straightforward application of the basic principle that mere laws of nature, natural phenomena, and abstract ideas are not within the categories of inventions or discoveries that may be patented under § 101.” *AT&T Corp. v. Excel Communications*, 172 F.3d 1352, 1360 (Fed. Cir. 1999).

Thus, the Court of Appeals for the Federal Circuit’s decision in *Warmerdam* has no bearing in the instant case, as neither the Examiner nor the Majority argues that claim 13 “is a straightforward application of the basic principle that mere laws of nature, natural phenomena, and abstract ideas are not within the categories of inventions or discoveries that may be patented under § 101.” Both the Examiner and the Majority appear to agree that the computer system *per se* constitutes patentable subject matter under section 101.

As to *Lowry*, as noted above, the data structures were not found to be analogous to printed matter, thus the holding in that case has no applicability to the issue of whether the nucleic acid sequences required by the computer

system of appealed claim 13 are functional or nonfunctional descriptive matter. Moreover, according to *Lowry*, all that is required by *Gulack* is that the printed matter perform a function. 32 F.3d at 1584. Here, the nucleic acids serve the function of allowing one to determine if a query sequence is identical or homologous to any of the nucleic acids of the claimed SEQ ID NOs.⁸

The Majority finds that the SEQ ID NOs recited in the claims are not functional, and thus not analogous to the data structures in *Lowry*, as there “is no evidence that SEQ ID NOs 9-1008 functionally affect the process of comparing a target sequence to a database by changing the efficiency or accuracy or any other characteristic of the comparison.” (Majority Op. 14.) Holding the descriptive material represented by the SEQ ID NOs to the level of functionality found in *Lowry*, however, is not a proper application of the law, as the *Lowry* court found that the data structures were not descriptive material as they defined functional aspects of the memory. 32 F.3d at 1583. What is required by the Court of Appeals of Federal Circuit is that the printed matter be *functionally related* to the substrate, not that the printed matter *itself serve a function*. If the SEQ ID NOs did “functionally affect the process of comparing a target sequence to a database by changing the

⁸ I have also considered the Majority’s analysis based on the USPTO’s examination guidelines relating to subject matter eligible for patenting. See Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility (“Guidelines”), 1300 Off. Gaz. Pat. Office 142 (November 22, 2005), especially pages 151-152. (Majority Op. 15-16). The Guidelines are essentially a restatement of the case law already discussed, and I disagree with the Majority’s analysis based on the Guidelines for the same reasons already stated with respect to the analysis of the case law.

efficiency or accuracy or any other characteristic of the comparison,” we would be back to the fact pattern in *Lowry*, and the printed matter cases would have no applicability to the patentability of the instant claims on appeal.

The Majority notes that the results may change based on which sequences are included in the database (Majority Op, 14, n. 5). According to the Majority, that “possibility does not mean that the database sequences are functional: MP3 files encoding different songs will cause a computer’s speaker to output different music, but music is a paradigmatic nonfunctional descriptive material. Descriptive material is not functional merely because it results in different outputs when acted on by a computer program.”

As noted by the Court of Appeals for the Federal Circuit, “[t]he very constitutional provision that authorized Congress to create a patent system, Article I, § 8, also limited the subject matter eligible for patent protection to the ‘useful arts.’” *In re Comiskey*, 499 F.3d 1365, 1374 (Fed. Cir. 2007). “The Constitution explicitly limited patentability to ‘the national purpose of advancing the useful arts—the process today called technological innovation.’” *Id.* (quoting *Paulik v. Rizkalla*, 760 F.2d 1270, 1276 (Fed. Cir. 1985) (en banc)). In my view, however, comparing sequences of nucleic acids to music is comparing apples and oranges, as music is not one of the “useful arts.” Using a computer based system, however, to determine if a query sequence matches a nucleic acid sequence that serves as a cancer marker, or a marker for other disease states, in my opinion, is a technological innovation that would certainly fall within the “useful arts.”

Thus, I agree with Judge Linn that “the outer limits of statutory subject matter should not depend on metaphysical distinctions such as those between hardware and software or matter and energy, but rather with the requirements of the patent statute: is an invention a ‘process,’ ‘machine,’ ‘manufacture,’ or ‘composition of matter,’ and is it ‘new’ and ‘useful’?” *Nuijten*, 500 F.3d at 1367 (Linn, concurring-in-part and dissenting-in-part).

No one would argue that one would have to consider the sequence limitations if one had a substrate, such as a glass slide, with a nucleic acid of a specific SEQ ID NO immobilized thereon. In addition, an array made up of said substrate would be newly patentable every time you added a nucleic acid of a new and non-obvious SEQ ID NO.⁹ Thus, an array of nucleic acids comprising a substrate and nucleic acids immobilized thereon could be covered by a thousand plus patents based on the SEQ ID NOs of the nucleic acids immobilized thereon. The array could then be used to hybridize a test nucleic acid sequence with nucleic acid sequences immobilized on the array to determine which nucleic acids of specified SEQ ID NOs the test sequence hybridizes to. In that way, one can determine the biological function of the test sequence based on the sequences with which it hybridizes. For example, one may be able to determine that the test sequence is a tumor marker, a marker for Alzheimer’s disease, a marker for a congenital birth defect, etc.

Claim 13 is drawn to a computer-based system, a machine for comparing query nucleic acid sequences to at least the sense or antisense sequence of at least 18 contiguous nucleotides of any one of SEQ ID

⁹ Assuming, of course, that it met all the statutory requirements for patentability.

NOS:9-1,008. One can use the computer-based system and obtain the same results as if those SEQ ID NOs were immobilized on the substrate of the array discussed above. Thus, under the Majority's analysis one product (the array) is patentable because it can be used to perform the wet chemistry, but the computer system, which can be used to obtain the same results as the process using the wet chemistry, is not, because the SEQ ID NOs are merely "abstract" representations of the structure of the nucleic acids.

I disagree that such a distinction is supported by the case law, and is the result intended by the patent laws. Accordingly, I would reverse the Examiner's rejection of claims 13 and 14 under 35 U.S.C. § 103(a) as obvious in view of Altschul.

ADAMS, *Administrative Patent Judge, concurring in the result:*

The majority's analysis of the record on appeal is internally inconsistent. In evaluating the issue of utility under 35 U.S.C. § 101 the majority gives the SEQ ID NOS patentable weight whereas the SEQ ID NOS receive no patentable weight in their analysis of the claims under 35 U.S.C. § 103. In one breath the majority finds that "the utility of the claimed computer system . . . depends on the utility of the nucleic acids of SEQ ID NOs 9-1008" (Majority Op. 7), but in another the majority finds that "the SEQ ID NOs and the computer do not depend on each other for their function" (Majority Op. 15).

Along the way the majority engages in a metaphysical discussion of the difference between nucleic acid molecules and SEQ ID NOS (Majority Op. 17-18). Cutting through the chaff, there is no doubt that SEQ ID NOS *per se* are data, and if Appellants had simply claimed SEQ ID NOS *per se*, the claims would properly be rejected under 35 U.S.C. § 101 as directed to patent ineligible subject matter. This is, however, not what Appellants have claimed, and a rejection of the claims as drawn to patent ineligible subject matter under 35 U.S.C. § 101 is not before this panel for review.

Nevertheless, the majority blends the concept of patent eligible subject matter under 35 U.S.C. § 101 with the "printed matter" doctrine under 35 U.S.C. § 103 to arrive at their conclusion that the claimed invention is obvious over a prior art reference that does not teach the SEQ ID NOS recited in Appellants' claims.

Accordingly, I cannot join with the majority's analysis of the record.

Claim Interpretation:

Claim 13 is drawn to a computer-based system - a machine¹⁰. The claim recites the intended function of the claimed machine; specifically it is for identifying nucleic acid fragments of the human genome of commercial importance. The claimed machine comprises three elements:

- a) a data storage means;
- b) a search means; and
- c) a retrieval means.

Claim 13 requires that the “data storage means”¹¹ comprise the sense or antisense sequence of at least 18 contiguous nucleotides of any one of SEQ ID NOS: 9-1,008. In response to a telephonic Restriction Requirement requiring, *inter alia*, Appellants to “elect a single nucleic acid sequence”,

¹⁰ According to Appellants’ Specification “[a]s used herein ‘a computer-based system’ refers to the hardware means, software means, and data storage means used to analyze the nucleotide sequence information of the present invention” (Spec. 102: 21-24).

The Supreme Court has defined the term “machine” as “a concrete thing, consisting of parts, or of certain devices and combination of devices.” *Burr v. Duryee*, 68 U.S. (1 Wall.) 531, 570, 17 L.Ed. 650 (1863). This “includes every mechanical device or combination of mechanical powers and devices to perform some function and produce a certain effect or result.” *Corning v. Burden*, 56 U.S. 252, 267, 15 How. 252, 14 L.Ed. 683 (1853).

In re Nuijten, 500 F.3d 1346, 1355 (Fed. Cir. 2007).

¹¹ “As used herein ‘data storage means’ refers to memory which can store nucleotide sequence information of the present invention, or a memory access means which can access manufactures having recorded thereon the nucleotide sequence information of the present invention” (Spec. 103: 1-5).

Appellants elected SEQ ID NO: 9, which they affirmed in their May 21, 2002 Response (May 21, 2002 Response 3). Accordingly, the Examiner finds “[t]he claims are drawn to a computer based system comprising . . . sequence identification software and a database comprising a fragment of SEQ ID NO:[]9 or a combination of the sequences of SEQ ID NOS: 9-1008” (Ans. 4). Therefore, on this record, the “data storage means” is the electronic equivalent of an array of nucleic acids on a substrate, e.g., a microtiter plate (*Cf.* Green Concurrence 32; Spec. 54: 26 - 55: 6).

As to the “search means”, claim 13 requires that the search means is “for comparing a target sequence to each of the sequences of the data storage means of step a) to identify homologous sequence(s).” Appellants’ use of the term “step” is misplaced. The “data storage means” of limitation “(a)” is not a *step*, but instead is an element (e.g., a component or part) of the claimed machine. Appellants’ Specification defines the term “search means” to mean one or more programs which are implemented on the computer-based system to compare a target sequence with the sequence information stored within the data storage means” (Spec. 103: 6-9). Accordingly, I interpret the term “search means” to refer to one or more programs implemented by the machine to compare a target sequence to the sequence information stored on the data storage means of *element* (a) in order to identify homologous sequence(s). Therefore, on this record, the “search means” is the electronic equivalent of the “wet chemistry” methodology used to compare a target sequence to a sequence on an array (*see, e.g.*, Spec. 17: 9 - 18: 14).

Claim 13 also requires that the “retrieval means” is “for obtaining said homologous sequence(s) of *step* (b)” (Claim 13 (emphasis added)). The “search means” of limitation “(b)” is not a *step*, but instead is an element (e.g., a component or part) of the claimed machine. Appellants’ Specification does not specifically define the term “retrieval means”. However, as I understand it, Appellants’ use of the term “retrieval means” corresponds to an “output means”.¹² According to Appellants’ Specification, “[a] variety of structural formats for the inputs and output means can be used to input an[d] output the information in the computer-based systems of the present invention. A preferred format for an output means ranks fragments of the homo sapiens genome possessing varying degrees of homology to the target sequence” (Spec. ¶ 0266). Accordingly, I interpret the term “retrieval means” of claim 13 to be one that obtains, or reports, the identity of homologous sequences identified by the search means. Therefore, on this record, the “retrieval means” is the electronic equivalent of “wet chemistry” techniques well known to those of ordinary skill in the art (*see, e.g.*, Spec. 53: 5-8).

Notwithstanding the mischaracterization of elements (a) and (b) as “steps”, claim 13 is drawn to a machine. Further, it should be clear that claim 13 is not attempting to claim the content of each SEQ ID NO. or the physical molecules that each represents. Claim 13 is also not drawn solely to data on a storage means. Instead, when considered as a whole, the

¹² This is consistent with the majority’s interpretation of the term. *See* Majority Op. 9 (“[t]he claimed system requires no functionality other than that required to compare a target sequence to SEQ ID NOs 9-1008 and output the result.”).

claimed computer system comprises a (a) data storage means, comprising specific sequence information; (b) search means; and (c) retrieval means. As such the subject matter claimed by Appellants falls within the statutory category of a “machine”.

More particularly, the claimed machine is the electronic equivalent of an array, hybridization method, and detection method utilized in “wet chemistry to identify target nucleic acids that are homologous to nucleic acids on an array. As my concurring colleague points out, no one would argue that an array comprising a novel and unobvious nucleic acid on a substrate (e.g., a microtiter plate) is a novel and nonobvious array (Green Concurrence 32-33). Further, no one would argue that the use of such a novel and unobvious array would be anticipated or obvious simply because hybridization and detection methods are known in the art. Claim 13 is the electronic equivalent of this “wet chemistry” array and methodology. Accordingly, as the nucleic acids are functionally tied to a “wet chemistry” array; the SEQ ID NOS are functionally tied to Appellants’ claimed machine.

The only other claim before this panel, claim 14 is drawn to “[t]he system of claim 13, wherein said data storage means comprises a combination of nucleic acid sequences comprising SEQ ID NOS:9-1,008” (Claim 14).

Patent Eligible Subject Matter:

“Whoever invents or discovers any new and useful process, *machine*, manufacture, or composition of matter, or any new and useful improvement

thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.” 35 U.S.C. § 101 (emphasis added). There are, however, a number of judicial exceptions to these categories of statutory invention. Therefore,

[d]etermining whether the claim falls within one of the four enumerated categories of patentable subject matter recited in 35 U.S.C. § 101 (process, machine, manufacture or composition of matter) does not end the analysis because claims directed to *nothing more than* abstract ideas (such as mathematical algorithms), natural phenomena, and laws of nature are not eligible and therefore are excluded from patent protection.

Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility (“Guidelines”), 1300 Off. Gaz. Pat. Office 142, 145 (November 22, 2005) (emphasis added). In addition, descriptive material (e.g., “printed matter”) standing alone and in the absence of a functional relationship with the underlying substrate “does not constitute a statutory process, machine, manufacture or composition of matter and should be rejected under 35 U.S.C. § 101.” *Id.* at 152.

The law is clear, however, that there is a distinction between statutory ineligible laws of nature, natural phenomena, abstract ideas, and descriptive material *per se* and the practical application of each. *See State Street Bank & Trust Co. v. Signature Fin. Group, Inc.*, 149 F.3d 1368, 1373 (Fed. Cir. 1998) (“[W]e hold that the transformation of data . . . by a machine through a series of mathematical calculations into a final share price, constitutes a *practical application* of a mathematical algorithm, formula, or calculation.”(emphases added)); *In re Alappat*, 33 F.3d 1526, 1544 (Fed. Cir. 1994) (“This is not a disembodied mathematical concept which may be

characterized as an ‘abstract idea,’ but rather a specific machine to produce a useful, concrete, and tangible result.”); *In re Cominsky*, 499 F.3d 1365, 1379 (Fed. Cir. 2007) (“When an unpatentable mental process is combined with a machine, the combination may produce patentable subject matter, as the Supreme Court’s decision in *Diehr* and our own decisions in *State Street Bank* and *AT&T* have confirmed.”); Guidelines at 152 (“Certain types of descriptive material, such as music, literature, art, photographs and mere arrangements or compilations of facts or data, *without any functional interrelationship* is not a process, machine, manufacture or composition of matter.” (emphasis added)); *In re Gulack*, 703 F.2d 1381, 1386 (Fed. Cir. 1983) (“the critical question is whether there exists any new and unobvious functional relationship between the printed matter and the substrate.” (footnote omitted)).¹³

Simply stated, “[i]f the claim is directed to a practical application of the § 101 judicial exception producing a result tied to the physical world that does not preempt the judicial exception, then the claim meets the statutory requirement of 35 U.S.C. § 101.” Guidelines at 146.

On this record, the majority correctly acknowledges that “[t]he utility of the claimed computer system . . . depends on the utility of the nucleic acids of SEQ ID NOs 9-1008” (Majority Op. 7). Stated differently,

¹³ As Justice Linn points out in his separate opinion in *In re Nuijen*, 500 F.3d 1346 (Fed. Cir. 2007),

[t]he “printed matter” rejection has been treated as a doctrine under § 103 rather than § 101, but it seems potentially more apposite as a consequence of the “useful” requirement of § 101. *Id.* at 1365-66. Accordingly, there is a reasonable basis for addressing the “printed matter” doctrine in the context of 35 U.S.C. § 101.

Appellants' claimed invention is not a disembodied listing of SEQ ID NO: 9 or SEQ ID NOS: 9-1,008 which may be characterized as an 'abstract idea' or 'non-functional descriptive matter,' but rather it is a specific machine that "requires no functionality other than that required to compare a target sequence to SEQ ID NOS 9-1008 and output the result" (Majority Op. 9).

The majority is also correct in finding that "the results of comparing a target sequence to a database may change depending on which sequences are included in the database" (*Id.* at 14 n. 5). As claimed, the machine and the SEQ ID NOS are functionally interrelated as the SEQ ID NOS alone would not be able to achieve the stated purpose of the claimed invention in the absence of the machine, and the machine without the SEQ ID NOS would similarly be unable to produce the desired result required by Appellants' claimed invention. *Cf. In re Ngai*, 367 F.3d 1336, 1339 (Fed. Cir. 2004). Therefore, Appellants' claimed machine is not simply a compilation of irrelevant SEQ ID NOS *per se*. Instead, Appellants' claimed invention defines a functional relationship between the SEQ ID NOS and the substrate. *Cf. Gulack*, 703 F.2d at 1386 ("[I]n examining Gulack's invention we find that a functional relationship does exist between the printed matter and the substrate.").

For the foregoing reasons it is no surprise that there is no dispute on this record that Appellants' claimed invention is directed to statutory subject matter.

Utility:

The question of whether Appellants' claimed invention comprising SEQ ID NOS: 9-1,008 satisfies the utility requirement of 35 U.S.C. § 101 is a different question. There is a valid issue, on this record, as to whether Appellants' claims have a utility that is both substantial and specific. *In re Fisher*, 421 F.3d 1365, 1371 (Fed. Cir. 2005) (“[O]ur predecessor court, the Court of Customs and Patent Appeals, and this court have required a claimed invention to have a specific and substantial utility to satisfy § 101.”). As the majority explains SEQ ID NOS: 9-1,008 do not have a “substantial” or “specific” utility (*see* Majority Op. 7-8). Because “the utility of the claimed computer system . . . depends on the utility of the nucleic acids of SEQ ID NOS 9-1008”, the claimed computer system also lacks utility.

Accordingly, I concur with the majority's decision to affirm the rejection of claims 13 and 14 under 35 U.S.C. §§ 101 and 112, first paragraph, for lack of patentable utility.

Obviousness:

The Examiner finds that the only difference between the computer system of Altschul and Appellants' claimed invention is “in the content of the nucleic acid comprised in the storage of the computer system” (Ans. 6). To make up for this difference the Examiner gives “no patentable weight . . . to the content [(SEQ ID NOS: 9-1008)] of the database on the claimed computer system” (Ans. 7). According to the Examiner, “sequences of SEQ ID NOS: 9-1008, constitute[] non-functional descriptive material because the content of the nucleic acid sequence database does not alter how the

computer system functions, i.e., the database of the claimed computer system does not reconfigure the computer system to perform a different function than the computer system of Altschul” (*id.*).

For their part, the majority steps away from the findings they make in their utility analysis regarding the interrelationship between the SEQ ID NOS (*see e.g.*, Majority Op. 7 (“[t]he utility of the claimed computer system . . . depends on the utility of the nucleic acids of SEQ ID NOs 9-1008.”)) and 9 (“[t]he claimed system requires no functionality other than that required to compare a target sequence to SEQ ID NOs 9-1008 and output the result.”). Instead, contrary to their findings under 35 U.S.C. § 101, the majority finds that under 35 U.S.C. § 103 the SEQ ID NOs have no functional relationship with the computer system, and are thus analogous to the instructions (e.g., the intended use limitation) in *In re Ngai*, 367 F.3d 1336, 1339 (Fed. Cir. 2004) (Majority Op. 13).

To support their position the majority provides a lengthy discussion of a number of cases relating to printed matter (Majority Op. 11-15). It cannot, however, be more clearly stated than our appellate reviewing court did in *In re Lowry*, 32 F.3d 1579 (Fed. Cir. 1994), “[t]he printed matter cases have no factual relevance where ‘the invention as defined by the claims *requires* that the information be processed not by the mind but by a machine, the computer.’” *Id.* at 1583 (Fed. Cir. 1994) (*quoting In re Bernhart*, 417 F.2d 1395, 1399 (CCPA 1969)).

Here, as in *Lowry*, the majority “erroneously extended a printed matter rejection under section[] . . . 103 to a new field in this case, which involves information stored in a memory.” *Lowry*, 32 F.3d at 1583. When

the claimed invention is considered as a whole the SEQ ID NOS are not merely data stored in a database with no relationship to the machine or its function. *Cf. Id.* (“Nor are the data structures analogous to printed matter. Lowry’s ADOs do not represent merely underlying data in a database. ADOs contain both information used by the application programs and information regarding their physical interrelationships with a memory.”). The SEQ ID NOS contain information used by the claimed machine to determine if a target sequence is homologous to the SEQ ID NOS. Stated differently, the SEQ ID NOS are functionally related to the machine and are required for the machine to perform its claimed function.

I recognize the majority’s attempt to contrast the “data structure in *Lowry*” with Appellants SEQ ID NOS 9-1008 (Majority Op. 13). The majority appears to be under the impression that in order for Appellants’ SEQ ID NOS to represent functional material the SEQ ID NOS must perform the same function as Lowry’s data structure. Specifically, the majority finds that

[t]he *Lowry* court . . . concluded that the claimed data structures were “physical entities that provide increased efficiency in computer operation” and were not analogous to printed matter. . . . There is no evidence that [Appellants’] SEQ ID NOS 9-1008 functionally affect the process of comparing a target sequence to a database by changing the efficiency or accuracy or any other characteristic of the comparison.

(Majority Opinion 13-14). *Lowry* does not stand for the proposition that in order for a “data structure” to be considered “functional” descriptive material it must somehow provide increased efficiency in computer

operation. This idea of “increased efficiency” was one of the tangible benefits of Lowry’s invention.

According to Lowry, the data structures provide tangible benefits: data stored in accordance with the claimed data structures are more easily accessed, stored, and erased. Lowry further notes that, unlike prior art data structures, Lowry’s data structures simultaneously represent complex data accurately and enable powerful nested operations. In short, Lowry’s data structures are physical entities that provide increased efficiency in computer operation.

Lowry, 32 F.3d at 1584. The tangible benefit here is to identify whether a target sequence is homologous to the sense or antisense sequence of at least 18 contiguous nucleotides of SEQ ID NO 9, or a combination of nucleic acid sequences comprising SEQ ID NOS: 9-1,008 (Claims 13 and 14). Contrary to the majority’s intimation, Appellant’s SEQ ID NOS are *not* non-functional descriptive matter simply because they serve a different purpose than Lowry’s data structures. On this record, the claimed machine would be wholly incapable of comparing a target sequence to each of the sequences of the data storage means comprising the sense or antisense sequence of at least 18 contiguous nucleotides of any one of SEQ ID NOS: 9-1,008 if SEQ ID NOS: 9-1,008 were not present in the machine.

Even assuming, as the majority and Examiner would like us to believe, that the data structures are analogous to printed matter; neither the majority nor the Examiner have established that the SEQ ID NOS, within the context of the entire claims, lack a new and nonobvious functional relationship with the machine. *Cf. Lowry*, 32 F.3d at 1584. To the contrary, as discussed above, the majority’s findings lead one to the conclusion that

when the claims are considered as a whole the SEQ ID NOS are functionally related to the substrate (*see e.g.*, Majority Op. 7 and 9). Therefore, here as in *Lowry*, the SEQ ID NOS “perform a function. *Gulack* requires no more.” *Lowry*, 32 F.3d at 1584 (citation omitted).

“Under section 103, the board cannot dissect a claim, excise the printed matter from it, and declare the remaining portion of the mutilated claim to be unpatentable.” *Gulack*, 703 F.2d at 1385. As the *Gulack* court explained, “[t]he claim must be read as a whole. If the board meant to disregard that basic principle of claim interpretation, we must reverse the rejection as a matter of law.” *Gulack*, 703 F.2d at 1385. This is, however, precisely what the majority has done in this case. For the reasons stated above, when the claims are read as a whole, the SEQ ID NOS recited in Appellants’ claims are functionally related to the machine.

I recognize the majority’s discussion of the “data structure” in *In re Warmerdam*, 33 F.3d 1354, 1362 (Fed. Cir. 1994) (Majority Op. 13). According to the majority, “[t]he court in *Warmerdam* concluded that the claimed ‘data structure’ was not a physical arrangement of hardware but instead was ‘nothing more than another way of describing the manipulation of ideas contained in’ other claims and therefore not statutory subject matter eligible for patenting” (*id.*). The majority’s discussion of *Warmerdam* is off base for a number of reasons.

First, the portion of *Warmerdam* relied upon by the majority is addressing the issue of whether *Warmerdam*’s claimed “data structure” was statutory subject matter within the meaning of 35 U.S.C. § 101, not whether the “data structure” was obvious under 35 U.S.C. § 103, which is the issue

upon which the majority relies on *Warmerdam* on this record. As discussed above, there is no dispute on this record that Appellants' claimed invention is statutory subject matter.

Second, the claims before this panel are directed to a "machine", not a "data structure" *per se*. This is a significant distinction. Claim 5 before the court in *Warmerdam* was directed to a machine. *Warmerdam*, 33 F.3d at 1358. The only rejection of this claim to a machine in *Warmerdam* was under 35 U.S.C. § 112, second paragraph. *Warmerdam*, 33 F.3d at 1360. In reversing the rejection under 35 U.S.C. § 112, second paragraph, the *Warmerdam* court expressly stated that "[w]hether such a programmed machine is new, useful, unobvious, or otherwise patentable is not at issue in this appeal, and we express no opinion thereon." *Warmerdam* 33 F.3d at 1361 (emphasis added). Thus, the majority's reliance on *Warmerdam* serves only to emphasize how they have dissected Appellants' claimed invention to reach their conclusion that "[t]he SEQ ID NOs recited in the claims are analogous to the instructions in *In re Ngai*" (Majority Op. 14). As discussed above, this analysis is contrary to the law the majority relies upon for support. *See Gulack*, 703 F.2d at 1385.

Third, building upon the distinction between a machine and a "data structure" *per se*, the *Warmerdam* court did not hold that all "data structures" represent non-statutory subject matter. Instead, finding that *Warmerdam*'s specific "data structure" represented non-statutory subject matter, the court went further to explain that in contrast "[t]he 'data structure' at issue in [*In re Bradley*, 600 F.2d 807 (CCPA 1979)] . . . was a physical, interconnected arrangement of hardware and thus embraced by the

term ‘*machine*’.” *Warmerdam*, 33 F.3d at 1362 (emphasis added).¹⁴ As my concurring colleague points out the holding in *Warmerdam*

“is a straightforward application of the basic principle that mere laws of nature, natural phenomena, and abstract ideas are not within the categories of inventions or discoveries that may be patented under § 101.” *AT&T Corp. v. Excel Communications*, 172 F.3d 1352, 1360 (Fed. Cir. 1999).

(Green Concurrence 29).

In this regard, the *Warmerdam* court explained that “[t]he body of claim 1 recites the steps of ‘locating’ a medial axis, and ‘creating’ a bubble hierarchy. These steps describe nothing more than the manipulation of basic mathematical constructs, the paradigmatic ‘abstract idea’ As a whole, the claim involves no more than the manipulation of abstract ideas.”

Warmerdam, 33 F.3d at 1360. Stated differently, *Warmerdam*’s claimed data structure fell within one of the judicial exceptions of statutory subject matter and when read as a whole the claimed data structure could not be interpreted as a practical application of that judicial exception. Accordingly, *Warmerdam* court affirmed the rejection of the data structure claims for lack of statutory subject matter under 35 U.S.C. § 101. *Warmerdam*, 33 F.3d at 1362. As discussed above, this is not the issue before this panel.

For the foregoing reasons, I agree with Judge Green’s conclusion that “*Warmerdam* has no bearing in the instant case” (*id.*).

¹⁴ See also *In re Nuijten*, 500 F.3d 1346 (Fed. Cir. 2007), wherein the court noted that the Board “found that [a storage medium having stored thereon a signal with embedded supplemental data] nominally puts the claim into the statutory category of a ‘manufacture’ and thus reversed the Examiner’s § 101 rejection of that claim.” *Id.* 500 F.3d at 1351.

I recognize the majority's reliance on *Ex parte Mathias*, 84 USPQ2d 1276 (BPAI 2005), *aff'd* 191 Fed.Appx. 959 (Fed. Cir. 2006). Notwithstanding the majority's characterization of *Mathias* as a "computer-implemented method" (Majority Op. 15), the panel in *Mathias* states that *Mathias*' "invention relates to an on-screen icon and method for producing said icon." *Mathias*, 84 USPQ2d at 1277. That is, however, the only mention of a method in the opinion. The *Mathias* panel found that *Mathias*' claim 1 was representative of the claimed invention. *Id.* *Mathias*' claim 1 was directed to "[a]n on-screen icon for viewing the score of a broadcast sporting event between contestants having color uniforms." *Id.* The *Mathias* panel found that the prior art "reference teaches everything recited in claim 1 except the limitation 'sporting' as argued by Appellant." *Id.* at 1278-79. Stated differently, the difference between the claimed "icon" and the prior art was the intended use of the "icon for viewing the score of a broadcast sporting event between contestants having color uniforms." *Mathias*, at 1277. Relying on *Ngai* and *Gulack* the panel correctly found that "our reviewing court has held that nonfunctional descriptive material cannot lend patentability to an invention that would have otherwise been anticipated by the prior art." *Id.* at 1279. *Cf. Ngai*, "[h]ere, the printed matter in no way depends on the kit, and the kit does not depend on the printed matter. All the printed matter does is teach a new use for an existing product." *Id.* at 1339.

Clearly, the facts in *Mathias* are analogous to those in *Ngai*, which for the reasons set forth above are distinct from the facts in this case. Thus, the majority's reliance on *Mathias* fails to support their position on this record.

The majority's reliance on *Ex parte Curry*, 84 USPQ2d 1272 (BPAI 2005), *aff'd* (Fed. Cir. Appeal No. 2006-1003, *aff'd* Rule 36 June 12, 2006) fails no better in relationship to the facts on this record. The *Curry* panel found claim 81 to be representative of the claimed invention. *Id.* at 1273.

For clarity, I reproduce Curry's claim 81 below:

81. A method of providing wellness-related services, including at least one of wellness, health, or fitness services through a publicly accessible distributed network to authorized users using authorized portals, comprising:
providing an online site that enables wellness-related databases to be accessed from at least one of a sponsored and a non-sponsored portal;
placing in communication at least one of a sponsored and non-sponsored portal to the online site through the publicly accessible distributed network wherein the publicly accessible distributed network includes the Internet, wherein the sponsored portal is at least in part sponsored by and located at, a fitness center, and wherein at least one of the non-sponsored portals accesses the on-line site through the Internet;
receiving a request at the online site requesting access to the wellness-related databases;
processing the request at the online site to determine whether the portal was sponsored and whether the request was received from an authorized user; and
responding to the request based in part on whether the portal was sponsored and whether the user is authorized.

Id. The *Curry* panel made two findings in the context of non-functional descriptive material. First, as claimed, "the 'wellness-related' data in the databases and communicated on the distributed network does not functionally change either the data storage system or communication system used in the method of claim 81." *Id.* at 1274. Indeed, as claimed, Curry's method simply requires that wellness-related databases be accessed. The

data on the databases is not functionally related to the method itself, the data is simply stored in the database and accessed through an online site. Further, Curry's claimed method does not require that the data be manipulated in any way. Therefore, as the *Curry* panel reasons, "if the prior art suggests storing a song on a disk, merely choosing a particular song to store on the disk would be presumed to be well within the level of ordinary skill in the art at the time the invention was made. The difference between the prior art and the claimed invention is simply a rearrangement of nonfunctional descriptive material." *Id.* at 1275.

The *Curry* panel's second finding relates to the sponsorship status of the portal limitation in claim 81. *Curry*, at 1275. As the *Curry* panel points out, the prior art teaches that limitation. *Id.* ("We find that Baker clearly teaches differing access rights based on location data including portal addresses. We find that the further labeling of a portal as sponsored or unsponsored does nothing to change the structure or functionality of the portal. [In this regard,] [w]e concur with the Examiner that this is nonfunctional descriptive material"). Stated differently, the particular limitation was taught by the prior art. Simply using different terminology (e.g. "label") to describe the same limitation taught by the prior art does not make the claimed invention nonobvious.

Clearly, the facts in *Curry* are not analogous to the facts on the record before this panel. The SEQ ID NOS are not simply a compilation of data that can be accessed by a computer as in *Curry*. Instead, as required by the claim before this panel, the SEQ ID NOS are functionally related to each element of the claimed machine and are required for the machine to perform

its function of identifying homologous sequences and outputting the result. Unlike the database in *Curry* that simply stores data for retrieval, like songs on a disk, on this record the SEQ ID NOS are integrally related to the stated purpose of the machine to identify target sequences that are homologous. As the majority acknowledges, “the results of comparing a target sequence to a database may change depending on which sequences are included in the database” (Majority Op. 14 n. 5). Stated differently, the operation of the machine to perform its stated purpose necessarily depends on the SEQ ID NOS. Thus, the SEQ ID NOS are functionally related to the machine. Further, unlike the facts in *Curry* there is no dispute that the prior art on this record fails to teach SEQ ID NOS 9-1,008.

Accordingly, I agree with my concurring colleague that “[t]he fact situations in [*Mathias* and *Curry*] . . . are very different from those presented by the instant appeal, and thus the outcomes in those cases have little bearing on the instant appeal” (Concurring Op. 28 n. 7).

Finally, I recognize the majority’s discussion of the Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility (“Guidelines”) (Majority Op. 15-16). The guidelines “are based on the USPTO’s current understanding of the law and are believed to be fully consistent with the binding precedent of the Supreme Court, the Federal Circuit and the Federal Circuit’s predecessor courts” (Guidelines at 142). Accordingly, for the reasons set forth above, the Guidelines fail to support the majority’s position.

On reflection, I find that the SEQ ID NOS are not taught by the prior art of record. In addition, I find that the SEQ ID NOS are functionally

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related to Appellants' claimed computer-based system. Accordingly, claims 13 and 14 are not obvious in view of Altschul. Therefore, I dissent from the majority's decision to affirm the rejection of claims 13 and 14 under 35 U.S.C. § 103 (Majority Op. 19).

Ssc

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