UNITED STATES PATENT AND TRADEMARK OFFICE

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PTOL-90A (Rev. 04/07)

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Ex parte DAVID CHARLES SCHWARTZ and JESSICA SEVERIN

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Appeal 2018-008510
Application 12/698,224[1]
Technology Center 1600

_____

Before ERIC B. GRIMES, TIMOTHY G. MAJORS and DAVID COTTA,
Administrative Patent Judges.

COTTA, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 involving claims to a
computer system for validating single molecule assemblies. The Examiner
rejected the claims on appeal as directed to patent ineligible subject matter
under 35 U.S.C. § 101.

We affirm.

STATEMENT OF THE CASE

The Specification discloses that "[s]ingle molecule optical mapping is . . . [an] effective approach for close and direct analysis of single molecules," providing data that may comprise e.g., "single molecule images, physical characteristics such as the length, shape and sequence, and restriction maps of single molecules." Spec. ¶ 5. According to the Specification, "a large number of images may be acquired in the course of a typical optical mapping experiment." *Id.* ¶ 7. Although such images are "rich with information," it can be "a challenge to devise practical ways to extract meaningful data from large datasets of molecular images." *Id.* ¶ 6.

> To extract useful knowledge from these images, effective systems are needed for researchers to evaluate the images, to characterize DNA molecules of interest, to assemble, where appropriate, the selected fragments thereby generating longer fragments or intact DNA molecules, and to validate the assemblies against established data for the molecule of interest.

Id. ¶ 7.

According to the Specification, there is a need for "systems for visualizing, annotating, aligning and assembling single molecule fragments" in order to allow users to "validate the resulting data in light of the established knowledge related to the molecules of interest." *Id.* ¶ 10. The Specification discloses a "visualization and editing system . . . [that] improves upon and expands the capabilities of [existing prior art sequence alignment and editing] programs in terms of speed and functionality, with color coding for error analysis, and better integration with both primary optical mapping image data and other biomedical databases." *Id.* ¶ 11.

Claims 1, 3–5, 7–9, 11–19, and 21 are on appeal. Claim 1, the only independent claim, is illustrative and reads as follows:

1. A computer system for validating single molecule assemblies, the computer system comprising:

    (a) a first database comprising single molecule data, the single molecule data derived from optical mapping of a single molecule assembly, wherein:

        said single molecule assembly comprises a first single molecule fragment and a second molecule fragment; and

        said first database comprises information to associate said single molecule data of the first single molecule fragment with said single molecule data of the second molecule fragment;

    (b) a second database comprising biomedical data associated with the single molecule assembly;

    (c) a first database connector communicatively linked to the first database, and a second database connector communicatively linked to the second database;

    (d) a user interface programmatically linked to the first database connector and the second database connector, the user interface displaying the single molecule data from the first database and the biomedical data from the second database, the user interface programmed to:

        display the single molecule data alongside the biomedical data;

        provide horizontal and vertical scaling of the single molecule data,

        receive user commands for interacting with the single molecule data and the biomedical data;

        delete a whole map from the single molecule data upon receipt of a first command from the user input device;

delete a restriction cut from the single
molecule data upon receipt of a second
command from the user input device; and
merge said first single molecule fragment
and said second molecule fragment upon
receipt of a third command from the user input
device; and

(e) a user input device communicatively linked to the
user interface, the user input device transmitting at
least one user input command for interacting with
the single molecule data.

The Examiner rejected claims 1, 3–5, 7–9, 11–19, and 21 under
35 U.S.C. § 101 as directed to patent ineligible subject matter.

ANALYSIS

An invention is patent-eligible if it claims a "new and useful process,
machine, manufacture, or composition of matter." 35 U.S.C. § 101.
However, the U.S. Supreme Court has long interpreted 35 U.S.C. § 101 to
include implicit exceptions: "[l]aws of nature, natural phenomena, and
abstract ideas" are not patentable. *E.g.*, *Alice Corp. v. CLS Bank Int'l*, 573
U.S. 208, 216 (2014).

In determining whether a claim falls within an excluded category, we
are guided by the Court's two-part framework, described in *Mayo* and *Alice*.
Id. at 217–18 (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*,
566 U.S. 66, 75–77 (2012)). In accordance with that framework, we first
determine what concept the claim is "directed to." *See Alice*, 573 U.S. at
219 ("On their face, the claims before us are drawn to the concept of
intermediated settlement, *i.e.,* the use of a third party to mitigate settlement
risk."); *see also Bilski v. Kappos*, 561 U.S. 593, 611 (2010) ("Claims 1 and 4

in petitioners' application explain the basic concept of hedging, or protecting against risk.").

Concepts determined to be abstract ideas, and thus patent ineligible, include certain methods of organizing human activity, such as fundamental economic practices (*Alice*, 573 U.S. at 219–20; *Bilski*, 561 U.S. at 611); mathematical formulas (*Parker v. Flook*, 437 U.S. 584, 594–95 (1978)); and mental processes (*Gottschalk v. Benson*, 409 U.S. 63, 67 (1972)). Concepts determined to be patent eligible include physical and chemical processes, such as "molding rubber products" (*Diamond v. Diehr*, 450 U.S. 175, 191 (1981)); "tanning, dyeing, making waterproof cloth, vulcanizing India rubber, smelting ores" (*id.* at 182 n.7 (quoting *Corning v. Burden*, 56 U.S. 252, 267–68 (1853))); and manufacturing flour (*Benson*, 409 U.S. at 69 (citing *Cochrane v. Deener*, 94 U.S. 780, 785 (1876))).

In *Diehr*, the claim at issue recited a mathematical formula, but the Court held that "a claim drawn to subject matter otherwise statutory does not become nonstatutory simply because it uses a mathematical formula." *Diehr*, 450 U.S. at 187; *see also id.* at 191 ("We view respondents' claims as nothing more than a process for molding rubber products and not as an attempt to patent a mathematical formula."). Having said that, the Court also indicated that a claim "seeking patent protection for that formula in the abstract . . . is not accorded the protection of our patent laws, and this principle cannot be circumvented by attempting to limit the use of the formula to a particular technological environment." *Id.* (citation omitted) (citing *Benson* and *Flook*); *see, e.g., id.* at 187 ("It is now commonplace that

an *application* of a law of nature or mathematical formula to a known
structure or process may well be deserving of patent protection.").

If the claim is "directed to" an abstract idea, we turn to the second part
of the *Alice* and *Mayo* framework, where "we must examine the elements of
the claim to determine whether it contains an 'inventive concept' sufficient
to 'transform' the claimed abstract idea into a patent-eligible application."
Alice, 573 U.S. at 221 (quotation marks omitted). "A claim that recites an
abstract idea must include 'additional features' to ensure 'that the [claim] is
more than a drafting effort designed to monopolize the [abstract idea].'" *Id.*
(alterations in original) (quoting *Mayo*, 566 U.S. at 77). "[M]erely
requir[ing] generic computer implementation[] fail[s] to transform that
abstract idea into a patent-eligible invention." *Id.*

In January 2019, the U.S. Patent and Trademark Office (USPTO)
published revised guidance on the application of § 101. 2019 Revised Patent
Subject Matter Eligibility Guidance, 84 Fed. Reg. 50 (Jan. 7, 2019)
("2019 Revised Guidance").[2] "All USPTO personnel are, as a matter of
internal agency management, expected to follow the guidance." *Id.* at 51;
see also October 2019 Update at 1.

Under the 2019 Revised Guidance and the October 2019 Update, we
first look to whether the claim recites:

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[2] In response to received public comments, the Office issued further
guidance on October 17, 2019, clarifying the 2019 Revised Guidance.
USPTO, *October 2019 Update: Subject Matter Eligibility* (the "October
2019 Update") (available at
https://www.uspto.gov/sites/default/files/documents/peg_oct_2019_update.p
df).

>   (1) any judicial exceptions, including certain groupings of abstract
>   ideas (i.e., mathematical concepts, certain methods of organizing
>   human activity such as a fundamental economic practice, or mental
>   processes) ("Step 2A, Prong One"); and
>
>   (2) additional elements that integrate the judicial exception into a
>   practical application (*see* MPEP § 2106.05(a)–(c), (e)–(h) (9th ed.
>   Rev. 08.2017, Jan. 2018)) ("Step 2A, Prong Two").[3]

2019 Revised Guidance, 84 Fed. Reg. at 52–55.

Only if a claim (1) recites a judicial exception and (2) does not integrate that exception into a practical application, do we then look, under Step 2B, to whether the claim:

>   (3) adds a specific limitation beyond the judicial exception that is not
>   "well-understood, routine, conventional" in the field (*see* MPEP
>   § 2106.05(d)); or
>
>   (4) simply appends well-understood, routine, conventional activities
>   previously known to the industry, specified at a high level of
>   generality, to the judicial exception.

2019 Revised Guidance, 84 Fed. Reg. at 52–56.

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[3] This evaluation is performed by (a) identifying whether there are any additional elements recited in the claim beyond the judicial exception, and (b) evaluating those additional elements individually and in combination to determine whether the claim as a whole integrates the exception into a practical application. *See* 2019 Revised Guidance - Section III(A)(2), 84 Fed. Reg. 54–55.

A. Claim 1 recites a judicial exception

Following the Guidance, we begin by considering whether claim 1 recites a judicial exception. We find that it does. In particular, element (d) of claim 1 recites that the user interface is programmed to undertake the following steps: "display . . . data," "provide . . . scaling of the . . . data," "receive user commands for interacting with the . . . data," "delete a whole map from the . . . data," "delete a restriction cut from the . . . data," and "merge [data]." Each of these steps involves ways of displaying and/or manipulating data that can be performed in the human mind with the aid of a pen and paper. For example, a person can display data on a sheet of paper by simply writing it down or, in the case of an optical map, drawing it. Similarly, a person can: scale data by enlarging or diminishing the size of the data depicted; delete data by erasing it; and merge data by combining it and presenting it together with other data. Finally a person can receive a user command by taking instructions from another person on how to present the data. Accordingly, we conclude the claim 1 recites a mental process, which is a category identified in the 2019 Revised Guidance as reciting an abstract idea.

Treating these steps recited in element (d) of claim 1 as an abstract idea is consistent with how the Federal Circuit has treated claims directed to displaying and/or manipulating data. As the Federal Circuit summarized in *Interval Licensing LLC v. AOL Inc.,* 896 F.3d 1335 (Fed. Cir. 2018):

> We have recognized that "[i]nformation as such is an intangible" and that collecting, analyzing, and displaying that information, without more, is an abstract idea. *Elec. Power Grp.*, 830 F.3d at 1353–54; *see also id.* at 1355 (noting claim requirement of "'displaying concurrent visualization' of two or

more types of information" was insufficient to confer patent
eligibility). We have also held that claims directed to
displaying two different information sets sequentially are
abstract. *See Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709,
715 (Fed. Cir. 2014) (claims directed to abstract idea of
"showing an advertisement before delivering free content").
Similarly, we have held that claims directed to a single display
of information collected from various sources are abstract. *See
Intellectual Ventures I LLC v. Capital One Fin. Corp.*, 850 F.3d
1332, 1341–42 (Fed. Cir. 2017) (holding claims which recited
creating a "dynamic document" using content from multiple
electronic records ineligible under § 101).

896 F.3d at 1344–1345. After summarizing the relevant case law, the court

in *Interval Licensing* found that the "[r]ecitation . . . of the collection,

organization, and display of two sets of information on a generic display

device is abstract absent a 'specific improvement to the way computers [or

other technologies] operate.'" *Id.* at 1345. Here, as in *Interval Licensing*,

the claims recite the "collection, organization, and display of two sets of

information on a generic display device." Here, as in *Interval Licensing,* the

claims recite an abstract idea.

In addition to the steps recited in element (d) of claim 1, we note that

the claim preamble recites a "system for validating single molecule

assemblies," and that validating single molecule assemblies involves making

a visual comparison between two sets of data to identify differences,

discrepancies, ambiguities or errors. Spec. ¶ 26 (explaining that the system

disclosed allows a user to "validate" "single molecule fragments or

assemblies" "by visual comparison with corresponding data contained in one

or more connected (single molecule or other biomedical) databases"); *id.* ¶

37 ("The system disclosed herein thus allows visual validation of the success

of the external contig assembly process through internal consistencies and error color coding discussed *infra.* Potential discrepancies, ambiguities or errors in the optical map assemblies or sequences can be identified. The system disclosed herein may also assist in detection of a veritable difference in sequence between individuals, strains or organisms."). Comparing and/or analyzing data is an abstract mental process. *In re BRCA1 & BRCA2-Based Hereditary Cancer Test Patent Litig.,* 774 F.3d 755, 763 (Fed. Cir. 2014) (concluding that concept of "comparing BRCA sequences and determining the existence of alterations" is an "abstract mental process"). Claim 1 thus recites a system for performing a mental process.

 B. Claim 1 is not integrated into a practical application

 Having determined that claim 1 recites a judicial exception, the Guidance directs us to next consider whether the claim integrates the judicial exception into a practical application. We look to see if, for example, any additional elements of the claim (i) reflect an improvement in the functioning of a computer or to another technological field, (ii) implement the judicial exception with, or by use of, a particular machine, (iii) effect a transformation or reduction of a particular article to a different state or thing, or (iv) use the judicial exception in some other meaningful way beyond generally linking the use of the judicial exception to a particular technological environment. *See* 2019 Revised Guidance, 84 Fed. Reg. at 55. Summarizing the relevant case law, the Guidance notes that courts have generally not considered an "additional element [that] . . . merely includes instructions to implement an abstract idea on a computer" to integrate a judicial application into a practical application. *Id.*

Here, the additional elements recited in claim 1 beyond the abstract idea recited in element (d) of claim 1 are generic computer components including, a "first database," a "second database," a "first database connector," a "user interface," and a "user input device." These additional limitations are claimed generically and defined broadly in the Specification. *See* Spec. ¶ 28, 35, 38, and 39. We do not find, and Appellant does not identify, any indication, that the claimed invention is implemented using other than generic computer components to perform generic computer functions. *See DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1256 (Fed. Cir. 2014) ("[A]fter *Alice*, there can remain no doubt: recitation of generic computer limitations does not make an otherwise ineligible claim patent-eligible.").

We also find no indication in the Specification that the claimed invention effects a transformation or reduction of a particular article to a different state or thing. Nor do we find anything of record that attributes an improvement in computer technology and/or functionality to the claimed invention or that otherwise indicates that the claimed invention integrates the abstract idea recited in claim 1 into a "practical application." Claim 1 requires manipulating data for analytical purposes using conventional computer components. The recitation of these conventional computer components does not integrate the patent ineligible subject matter into a practical application.

Appellant argues that claim 1 is not directed to an abstract idea but is instead "rooted in computer technology to overcome a problem specifically arising in user interfaces used for displaying single molecule data." App. Br.

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6. Appellant contends that "[b]y providing a user interface that enables the scaling, manipulation through deletion, and merging of single molecule data, claim 1 is necessarily rooted in computer technology to overcome problems with graphical user interfaces for displaying and manipulating large single molecule datasets." *Id.* at 7–8. In its Reply Brief, Appellant points to teachings in the Specification that the claimed invention "improves upon and expands the capabilities of [previous visualization and editing systems] in terms of speed and functionality, with color coding for error analysis, and better integration with both primary optical mapping image data and other biomedical databases." Reply Br. 2 (citing Spec. ¶ 11). Appellant elaborates that its system "provides the improvement that '[p]otential discrepancies, ambiguities or errors in the optical map assemblies or sequences can be identified.'" *Id.* (quoting Spec. ¶ 37). In view of these improvements, Appellant argues that its claimed system is "similar to the claims at issue in *Core Wireless Licensing S.A.R.L., v. LG Electronics, Inc.,* 880 F.3d 1356 (Fed. Cir. 2018), which were directed to an improved user interface." *Id.* at 6. We are not persuaded.

Claim 1 recites generic computer components including, a "first database," a "second database," a "first database connector," a "user interface," and a "user input device." These components are defined broadly in the Specification. Spec. ¶ 28 ("a database in various embodiments of this disclosure may be flat data files and/or structured database management systems such as relational databases and object databases. Such a database thus may comprise simple textual, tabular data included in flat files as well as complex data structures stored in comprehensive database systems."); *id.*

¶¶ 38 & 39 (providing multiple examples of suitable databases); *id.* ¶ 35 ("The terms, 'user interface,' and 'viewer,' as used herein may be used interchangeably, and refer to any kind of computer-application or program that enables interactions with a user."). Claim 1 uses these generic components as a tool to perform the function of displaying and manipulating data, but does not recite an improvement to the overall computer system, its components, or any particular computer technology. *See McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1314–15 (Fed. Cir. 2016) (finding claims not abstract because they "focused on a specific asserted improvement in computer animation"). Instead, it recites a new arrangement of two sets of data that assists users in making a visual comparison between the two sets of data, using a computer as a tool to make that comparison.

Appellant's reliance on *Core Wireless* is inapposite. In *Core Wireless*, the claims were directed to "an improved user interface for electronic devices." *Core Wireless*, 880 F.3d at 1363. The specification in *Core Wireless* disclosed that the claimed invention improved the "efficiency of using the electronic device by bringing together 'a limited list of common functions and commonly accessed stored data,' which can be accessed directly from the main menu." *Id*. The specification also disclosed that the claimed invention improved "[t]he speed of a user's navigation through various views and windows." *Id*. Based on these disclosures, the Federal Circuit concluded that the claims were "clearly . . . directed to an improvement in the functioning of computers, particularly those with small screens." *Id*.

The Federal Circuit rejected an attempt to extend *Core Wireless* similar to Appellant's argument here in *Trading Techs. Int'l, Inc. v. IBG LLC,* explaining:

> Relying principally on *Core Wireless*, TT argues the claimed invention provides an improvement in the way a computer operates. We do not agree. The claims of the '999 patent do not improve the functioning of the computer, make it operate more efficiently, or solve any technological problem. Instead, they recite a purportedly new arrangement of generic information that assists traders in processing information more quickly.

921 F.3d 1084, 1093 (Fed. Cir. 2019) (internal citations omitted) (finding that the claims were directed to "the abstract idea of graphing bids and offers to assist a trader to make an order"). Here, as in *Trading Techs.,* claim 1 does not improve the functioning of the computer, make it operate more efficiently, or solve any technological problem. Instead, it is directed to a purportedly new arrangement of generic information that assists users in processing information more quickly.

C. Claim 1 does not provide an inventive concept

Having determined that the judicial exception recited in claim 1 is not "integrated into a practical application," the Guidance directs us to "evaluate the additional elements individually and in combination . . . to determine whether they provide an inventive concept (i.e., whether the additional elements amount to significantly more than the exception itself)." Memorandum, 84 Fed. Reg. at 56. Here, the judicially excepted subject matter is the programming relating to how the user interface manipulates and displays data. The additional elements recited in the claim, whether

considered individually or in combination, do not amount to significantly more than the exception itself. As discussed above, they specify that the judicial exception is implemented using conventional computer components.

> Appellant argues:

> [C]laim 1 includes limitations that amount to significantly more than an abstract idea itself because when viewed as an ordered combination claim 1 provides an improvement in the ability of the computer system to display information and interact with the user in relation to validating, updating, and displaying single molecule data, such as restriction maps, restriction fragments, and contig assemblies.

App. Br. 9–10. We are not persuaded.

We recognize that the claimed system may improve the ability of a user to validate or analyze the recited data. However, any such improvement is rooted in the arrangement and manipulation of data — i.e., in the abstract idea itself — rather than in any particular computer component or technology.

Appellant contends that claim 1 is similar to Example 23 provided in Appendix 2 to the Office's July 2015 Update on Subject Matter Eligibility, which describes a method for "dynamically relocating textual information within an underlying window displayed in a graphical user interface." Reply Br. 7. Appellant argues:

> [C]laim 4 in Example 23 was described as being patent eligible because the "limitations [in that example] recite a specific application of [a] mathematical algorithm that improves the functioning of the basic display function of the computer itself." *July 25 Update Examples,* p. 12. In particular, the USPTO stated that "scaling and relocating the textual information in overlapping windows improves the ability of the

computer to display information and interact with the user."
July 25 Update Examples, p. 12.

Id. at 7–8. According to Appellant, the same rationale applies to claim 1, which recites functions of the user interface that "improve[] the ability of the claimed computer system to display single molecule data and to interact with the user." *Id.* at 8. We are not persuaded.

As explained by the Office, the method recited in claim 4 of Example 23 "recite[s] a specific application of the mathematical algorithm that improves the functioning of the basic display function of the computer itself." Appendix 2, July 2015 Update on Subject Matter Eligibility, p. 12. We do not view claim 1 as reciting an application of the judicially excepted subject matter that improves the basic display function of the computer itself or any other aspect of the generically recited computer components. Instead, for the reasons discussed above, we view claim 1 as reciting a new arrangement of generic information.

Considering the additional elements beyond the recited abstract idea individually and in combination we find that they do not amount to significantly more than the exception itself. Accordingly, we affirm the Examiner's rejection of claim 1 as directed to patent ineligible subject matter. Because they were not argued separately, claims 5, 7–9, 13, 14, 17–19, and 21 fall with claim 1.

D. Claims 3, 4, and 12 are directed to patent ineligible subject matter

Claim 3, 4, and 12 depend from claim 1 and recite additional limitations regarding how the user interface is programmed to display the recited data. Claim 3 thus recites that "the user interface [is] further programmed to display the first molecule data in a first row and the second

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molecule data in a second row, the first row and the second row being proximately located on the user interface." Claim 4 recites that "the user interface [is] further programmed to differentiate the first molecule data from the second molecule data using a color code." And claim 12 recites that "the user interface is further programmed to differentiate single molecule data from the biomedical data using color coding."

We first consider whether Claims 3, 4, and 12 recite an abstract idea and conclude that they do, at least because they depend from claim 1, which recites an abstract idea.

We next consider whether claims 3, 4, and 12 integrate the claimed abstract idea into a practical application. Here, the additional elements recited in claims 3, 4, and 12 beyond the judicial exception are generic computer components including, a "first database," a "second database," a "first database connector," a "user interface," and a "user input device." As discussed in connection with claim 1, these additional elements do not integrate the judicially excepted subject matter into a practical application.

Appellant argues that the additional limitations recited in claims 3, 4, and 12 further define the claimed system as non-abstract because they recite an improvement "necessarily rooted in computer technology in order to overcome a problem specifically arising in the use of a user interface for displaying and manipulating single molecule data and biomedical data." App. Br. 11, 14, 20. We are not persuaded for the reasons discussed in connection with claim 1 and because specifying the position and color of data displayed does not improve the recited computer system, its components, or any particular computer technology. *See McRO, Inc. v.*

Bandai Namco Games Am. Inc., 837 F.3d 1299, 1314–15 (Fed. Cir. 2016) (finding claims not abstract because they "focused on a specific asserted improvement in computer animation"). Instead, it recites a new arrangement of two sets of data that assists users in making a visual comparison between the two sets of data, using a computer as a tool to make that comparison. Claims 3, 4, and 12 are thus, like the claims in *Interval Licensing,* directed to the "collection, organization, and display of two sets of information on a generic display device."

Finally, we consider whether claims 3, 4, and 12 provide an inventive concept — i.e. something significantly more than the judicial exception itself. Appellant argues that claims 3, 4, and 12 amount to significantly more than an abstract idea because, when viewed as an ordered combination, they "provide[] an improvement in the ability of the computer system to display information and interact with the user in relation to validating, updating, and displaying single molecule data, such as restriction maps, restriction fragments, and contig assemblies." App. Br. 13, 16, 22. We are not persuaded because, as discussed with respect to claim 1, any such improvement is rooted in the arrangement and manipulation of data — i.e., in the abstract idea itself — rather than in any particular computer component or technology. Considering the additional elements recited in claims 3, 4, and 12 beyond the recited abstract idea individually and in combination we find that they do not amount to significantly more than the exception itself.

Accordingly, we affirm the Examiner's rejection of claims 3, 4, and 12 as directed to patent ineligible subject matter.

E. Claim 11 is directed to patent ineligible subject matter

Claim 11 depends from claim 1 and further requires that "the user interface is a graphical user interface, the graphical user interface being programmed to display a window for displaying the single molecule data alongside the biomedical data." Although requiring that the user interface be "graphical" does narrow the "user interface" limitation of claim 1, a "graphical user interface" is still a generic, broadly defined computer component. *See* Spec. ¶ 35 ("Examples of GUIs include Microsoft Internet Explorer™ and Netscape Navigator™[,] Adobe Illustrator, Adobe Photoshop, Adobe Acrobat, Microsoft Powerpoint, Microsoft Excel, CricketGraph, Corel Draw, Ximian Evolution, and StarOffice."). Accordingly, the recitation in claim 11 that the user interface is a "graphical user interface" does not materially alter the analysis set forth in connection with claim 1.

In addition to specifying that the user interface is a "graphical user interface," claim 11 also requires that the interface be programmed to "display[] the single molecular data alongside the biomedical data." This requirement is similar to the requirement of claim 3 that the first molecule data and second molecule data be in two proximately located rows in that both specify a position in which data is displayed. For the reasons discussed in connection with claim 3, specifying the position in which data is displayed does not confer patent eligibility on an otherwise ineligible claim.

Appellant's arguments that claim 11 is patent eligible parallel those set forth in connection with claim 1 and 3. App. Br. 16–19. Accordingly,

we affirm the Examiner's rejection of claim 11 for the reasons discussed in connection with claims 1 and 3.

F. Claims 15 and 16 are directed to patent ineligible subject matter

Claim 15 depends from claim 1 and further requires that the system comprise "a third database and a third database connector communicatively linked to the third database, the third database comprising genetic annotation data associated with the single molecule data" and that the "user interface [is] further programmed to display the genetic annotation data." Claim 16 depends from claim 15 and further requires that "the genetic annotation data is displayed along side the single molecule data and the biomedical data."

We first consider whether Claims 15 and 16 recite an abstract idea and conclude that they do, at least because they depend from claim 1, which recites an abstract idea.

We next consider whether claims 15 and 16 integrate the claimed abstract idea into a practical application. Here, the additional elements recited in claims 15 and 16 beyond the judicial exception include elements recited in claim 1 — i.e., a "first database," a "second database," a "first database connector," a "user interface," and a "user input device." As discussed in connection with claim 1, these additional elements do not integrate the judicially excepted subject matter into a practical application. In addition, claim 15 recites the additional elements of a "third database," and a "third database connector." These additional elements are claimed generically and defined broadly in the Specification. *See* Spec. ¶ 28, 38, and 39. We do not find, and Appellant does not identify, any indication, that the claimed invention is implemented using other than generic computer

components to perform generic computer functions. *See DDR Holdings,* 773 F.3d at 1256 ("[A]fter *Alice,* there can remain no doubt: recitation of generic computer limitations does not make an otherwise ineligible claim patent-eligible.").

We also find no indication in the Specification that the claimed invention effects a transformation or reduction of a particular article to a different state or thing. Nor do we find anything of record that attributes an improvement in computer technology and/or functionality to the claimed invention or that otherwise indicates that the claimed invention integrates the abstract idea recited in claims 15 and 16 into a "practical application." Claims 15 and 16 require manipulating data for analytical purposes using a conventional computer components. The recitation of these conventional computer components does not integrate the patent ineligible subject matter into a practical application.

Appellant argues that the additional limitations recited in claims 15 and 16 further define the claimed system as non-abstract because they recite an improvement "necessarily rooted in computer technology in order to overcome a problem specifically arising in the use of a user interface for displaying and manipulating single molecule data and biomedical data." App. Br. 23, 26. We are not persuaded for the reasons discussed in connection with claim 1 and because requiring a third set of data — i.e., "genetic annotation data" — that is displayed alongside the first two sets of data does not improve the recited computer system, its components, or any particular computer technology. *See McRO, Inc. v. Bandai Namco Games Am. Inc.,* 837 F.3d 1299, 1314–15 (Fed. Cir. 2016) (finding claims not

abstract because they "focused on a specific asserted improvement in computer animation"). Instead, it recites a new arrangement of three sets of data that assists users in making a visual comparison between the three sets of data, using a computer as a tool to make that comparison. Claims 15 and 16 are thus, like the claims in *Interval Licensing,* directed to the "collection, organization, and display of two sets of information on a generic display device."

Finally, we consider whether claims 15 and 16 provide an inventive concept — i.e. something significantly more than the judicial exception itself. Appellant argues that claims 15 and 16 amount to significantly more than an abstract idea because, when viewed as an ordered combination, they "provide[] an improvement in the ability of the computer system to display information and interact with the user in relation to validating, updating, and displaying single molecule data, such as restriction maps, restriction fragments, and contig assemblies." App. Br. 24–25, 27. We are not persuaded because, as discussed with respect to claim 1, any such improvement is rooted in the arrangement and manipulation of data — i.e., in the abstract idea itself — rather than in any particular computer component or technology. Considering the additional elements recited in claims 15 and 16 beyond the recited abstract idea individually and in combination we find that they do not amount to significantly more than the exception itself.

Accordingly, we affirm the Examiner's rejection of claims 15 and 16 as directed to patent ineligible subject matter.

SUMMARY

In summary:

Claims Rejected	35 U.S.C. §	Basis	Affirmed	Reversed
1, 3–5, 7–9, 11–19, 21	101	ineligible subject matter	1, 3–5, 7–9, 11–19, 21	

TIME PERIOD FOR RESPONSE

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

AFFIRMED