Trials@uspto.gov
571-272-7822

Paper 11
Entered: January 22, 2019

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BENSON HILL BIOSYSTEMS, INC.,
Petitioner,

v.

THE BROAD INSTITUTE INC.,
PRESIDENTS AND FELLOWS OF HARVARD COLLEGE &
MASSACHUSETTS INSTITUTE OF TECHNOLOGY,
Patent Owner.

Case PGR2018-00072
Patent 9,790,490 B2

Before SHERIDAN K. SNEDDEN, CHRISTOPHER G. PAULRAJ, and KRISTI L. R. SAWERT, *Administrative Patent Judges*.

SAWERT, *Administrative Patent Judge*.

DECISION
Denying Institution of Post-Grant Review
37 C.F.R. § 41.208

I. INTRODUCTION

Benson Hill Biosystems, Inc. ("Petitioner") filed a Petition for a post-grant review of all sixty claims of U.S. Patent No. 9,790,490 B2 ("the '490 patent," Ex. 1001). Paper 2 ("Pet."). The Broad Institute, Inc., President and Fellows of Harvard College & Massachusetts Institute of Technology (collectively, "Patent Owner") filed a Preliminary Response. Paper 9 ("Prelim. Resp.").

We have authority to determine whether to institute a post-grant review under 35 U.S.C. § 324 and 37 C.F.R. § 42.4(a). We may not institute a post-grant review unless "the information presented in the petition . . . if such information is not rebutted, would demonstrate that it is more likely than not that at least 1 of the claims challenged in the petition is unpatentable." 35 U.S.C. § 324(a).

Applying those standards, and upon consideration of the information presented in the Petition and the Preliminary Response, we determine that Petitioner has not demonstrated that it is more likely than not that at least one claim of the '490 patent is unpatentable. Accordingly, we do not institute a post-grant review of any claim of the '490 patent.

A. Related Proceedings

Petitioner and Patent Owner state that no related judicial matters are pending. Pet. 70. Both parties identify two pending patent applications, U.S. Patent Application No. 15/844,608 and U.S. Patent Application No. 15/783,770, which claim priority to the application leading to the '490 patent, as related matters. *Id.*; Paper 8, 1. Patent Owner also identifies

pending international application PCT/US16/38181, which claims priority to the application leading to the ’490 patent, as a related matter. Paper 8, 1.

B. The ’490 patent

The ’490 patent relates to a CRISPR[1] system for targeting a nucleic acid sequence of interest, comprising a Cpf1 effector protein and an engineered guide polynucleotide. Ex. 1001, Abstract. According to the ’490 patent, the Cpf1 effector protein is a novel RNA-endonuclease. *Id.* at 25:59–60.

The Cpf1 effector protein forms a complex with the guide polynucleotide, which is designed to hybridize to the target nucleic acid sequence. *Id.* at 26:15–17. Upon binding of the complex to the target sequence, the Cpf1 effector protein induces a “modification of the sequences associated with or at the target locus of interest.” *Id.* at 2:47–51. “In a preferred embodiment, the modification is the introduction of a strand break.” *Id.* at 3:8–9.

Unlike other known CRISPR systems, the CRISPR-Cpf1 system of the ’490 patent system lacks a tracr sequence. *Id.* at 25:64–66. In this regard, “Applicants determined that Cpf1 effector protein complexes comprising only a Cpf1 effector protein and a crRNA (guide RNA comprising a direct repeat sequence and a guide sequence) were sufficient to cleave target DNA.” *Id.* at 5:40–43.

[1] CRISPR stands for “Clustered Regularly Interspaced Short Palindromic Repeats.” *E.g.*, Ex. 1001, 1:48–49. CRISPR systems were first discovered in bacteria and archaea, where they play a role in adaptive immunity by specifically cleaving foreign nucleic acids. *See, e.g.*, Ex. 2011.

The ’490 patent also discloses engineered Cpf1 effector proteins that, by “mutation of one or more amino acid residues of the effector protein,” have “reduced or abolished nuclease activity compared with an effector protein lacking said one or more mutations.” *Id.* at 6:38–44. This “effector protein may not direct cleavage of one or other DNA or RNA strand at the target locus of interest.” *Id.* at 6:45–46.

C. Challenged Claims

Petitioner challenges claims 1–60 of the ’490 patent. Pet. 14–15. The ’490 patent contains four independent claims. Ex. 1001, 547:49–549:26. Independent claims 1, 2, and 4 are drawn to an engineered, non-naturally occurring system comprising either a Cpf1 effector protein (claims 1 and 4) or a nucleotide sequence encoding a Cpf1 effector protein (claims 2 and 4), and at least one engineered guide polynucleotide (claims 1 and 4) or a nucleotide sequence encoding an engineered guide polynucleotide (claims 2 and 4). *Id.* Independent claim 3 is similar, but drawn to an engineered, non-naturally occurring vector system. *Id.* at 548:58–549:9. Claim 1 is representative:

> 1. An engineered, non-naturally occurring system comprising
>
> a) a Cpf1 effector protein, and
>
> b) at least one engineered guide polynucleotide designed to form a complex with the Cpf1 effector protein and comprising a guide sequence, wherein the guide sequence is designed to hybridize with a target sequence in a eukaryotic cell; and
>
> wherein the system lacks a tracr sequence, the engineered guide polynucleotide and Cpf1 effector protein do not naturally

> occur together, and a complex of the engineered guide polynucleotide and Cpf1 effector protein does not naturally occur.

Id. at 547:49–61.

D. Asserted Grounds of Unpatentability

Petitioner challenges the patentability of claims 1–60 on multiple grounds. Pet. 14–15. Petitioner presents the final two grounds—lack of utility and obviousness—as alternative grounds "if the Board disagrees with Petitioner's proposed claim construction." *Id.* at 14.

Claims	Statutory Basis
1–60	Lack of written description under 35 U.S.C. § 112(a) for a genus of Cpf1 effector proteins
1–60	Lack of enablement under 35 U.S.C. § 112(a) for a genus of Cpf1 effector proteins
1–60	Indefiniteness under 35 U.S.C. § 112(b) of "Cpf1 effector protein"
1–60	Lack of enablement under 35 U.S.C. § 112(a) for a genus of systems lacking a tracr sequence
1–60	Lack of written description under 35 U.S.C. § 112(a) for a genus of systems lacking a tracr sequence
1–60	Lack of utility under 35 U.S.C. § 101
1–60	Obviousness under 35 U.S.C. § 103 over Schunder,[2] general knowledge in the art, and various secondary references

Id. at 13–14. Petitioner also relies on the Declaration of Chase L. Beisel, Ph.D. (Ex. 1003). *E.g.*, *id.* at 1. Patent Owner disputes that Petitioner's asserted grounds render the challenged claims unpatentable. *See generally* Prelim. Resp.

[2] Eva Schunder et al., *First Indication for a Functional CRISPR/Cas System in* Francisella tularensis, 303 INT'L J. MED. MICROBIOL. 51–60 (2013). Ex. 1004 ("Schunder").

II. ANALYSIS

We address below whether the Petition meets the threshold showing for institution of a post-grant review under 35 U.S.C. § 321(a). We consider each ground of unpatentability in view of the understanding of a person of ordinary skill in the art.

Petitioner contends that a person of ordinary skill in the art would have had an M.D. or a Ph.D. in biology, chemistry, engineering (e.g., chemical engineering, biological engineering, biomedical engineering, or biochemical engineering), biophysics, or a related discipline, with a focus on genetic modification techniques and at least three years of experience working in industry and/or academia on genetic modification techniques. Pet. 9–10. Patent Owner offers no definition of a person of ordinary skill in the art in its Preliminary Response. Prelim. Resp. 12.

For the purpose of this decision, we accept Petitioner's proposed definition and also find that the prior art itself is sufficient to demonstrate the level of ordinary skill in the art at the time of the invention. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (the prior art, itself, can reflect appropriate level of ordinary skill in art). Further, based on the information presented at this stage of the proceeding, we consider Petitioner's declarant—Dr. Beisel—qualified to opine about the perspective of an ordinary artisan at the time of the invention. *See* Ex. 1003 ¶¶ 5–16, Appendix B (curriculum vitae of Dr. Beisel).

A. Eligibility for Post-Grant Review

The post-grant review provisions set forth in Section 6(d) of the AIA[3] apply only to patents subject to the first-inventor-to-file provisions of the AIA. *See* AIA § 6(f)(2)(A) ("The amendments made by subsection (d) . . . shall apply only to patents described in section 3(n)(1)."). Patents subject to the first-inventor-to-file provisions are those that issue from applications "that contain[] or contained at any time . . . a claim to a claimed invention that has an effective filing date as defined in section 100(i) of title 35, United States Code, that is on or after" March 16, 2013. AIA § 3(n)(1). Our rules require that each petitioner for post-grant review certify that the challenged patent has an effective filing date that renders the patent available for post-grant review. 37 C.F.R. § 42.204(a) ("The petitioner must certify that the patent for which review is sought is available for post-grant review . . . ."). In addition, "[a] petition for a post-grant review may only be filed not later than the date that is 9 months after the date of the grant of the patent or of the issuance of a reissue patent (as the case may be)." 35 U.S.C. § 321(c); *see also* 37 C.F.R. § 42.202(a) (accord).

Petitioner states that the '490 patent is eligible for post-grant review because "the '490 patent was filed under the AIA" and "this Petition is being filed within nine months of the date the patent issued." Pet. 14. Patent Owner does not dispute post-grant review eligibility. *See generally* Prelim. Resp. On this record, we determine that the '490 patent is eligible for post-grant review. Specifically, the application leading to the '490 patent was

[3] Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) ("AIA").

filed on December 18, 2015, and claims priority to several provisional applications filed in June, July, August, and September of 2015. Ex. 1001, (22), (60). All these dates fall after March 16, 2013. Also, this Petition was filed on July 17, 2018, which is nine months after the October 17, 2017, issue date of the '490 patent. *Id.* at (45); Paper 4, 1.

B. Claim Construction

For petitions filed before November 13, 2018, claim terms are interpreted according to their broadest reasonable construction in light of the specification of the patent in which they appear. *See* 37 C.F.R. § 42.100(b) (2016) [4]; *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation standard).

Under that standard, we presume that a claim term carries its "ordinary and customary meaning," which "is the meaning that the term would have to a person of ordinary skill in the art in question" at the time of the invention. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007); *see also Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1062 (Fed. Cir. 2016) ("Under a broadest reasonable interpretation, words of the claim must be given their plain meaning, unless such meaning is inconsistent with the specification and prosecution history."). Any special definition for a claim

[4] The claim construction standard recently changed for all post-grant proceedings filed on or after November 13, 2018. *See Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board*, 83 FED. REG. 51340 (Oct. 11, 2018). But, based on the filing date of the Petition in this proceeding, the applicable claim construction standard remains the "broadest reasonable construction," as set forth in 37 C.F.R. § 42.100(b) (2016).

term must be set forth in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994).

Claim 1 recites "at least one engineered guide polynucleotide designed to form a complex with the Cpf1 effector protein and comprising a guide sequence, wherein the guide sequence is designed to hybridize with a target sequence in a eukaryotic cell." Ex. 1001, 547:51–56. Petitioner argues that this language "requires a system in which the recited Cpf1 protein exhibits effector protein function in a eukaryotic cell." Pet. 11 (citing Ex. 1003 ¶¶ 62, 67–68). To exhibit effector protein function, Petitioner argues, "the Cpf1 protein must form a complex with a guide sequence and be capable of hybridizing to a target sequence in a eukaryotic cell and cleaving the target sequence." *Id.* at 13–14 (citing Ex. 1003 ¶ 70).

Petitioner argues that the written description of the '490 patent supports this interpretation, "by teaching that the claimed nucleic-acid targeting complexes are used for 'modifying (e.g., deleting, inserting, translocating, inactivating, activating) a target DNA or RNA in a multiplicity of cell types.'" Pet. 11–12 (quoting Ex. 1001, 42:3–7; citing Ex. 1001, 77:45–54, 2:42–51, 2:65–3:8, 3:57–59; 4:5–11, 4:58–66, 30:30–35, 42:15–18, 43:55–63, 64:31–40, 65:2–5, 72:59–60, 73:23–32, 77:25–36, 84:23–32, 156:29–44; 185:61–186:5). Petitioner acknowledges that the '490 patent discloses catalytically inactive Cpf1 effective proteins, but argues that these proteins are "certainly not the focus of the specification," and that, in any event, Patent Owner expressly disavowed those non-functional

embodiments during prosecution. *Id.* at 12–13 (citing Ex. 1002, 6184; Ex. 1003 ¶ 69).

Petitioner also argues that "the Examiner required Patent Owners to amend the claims prior to allowance to recite that 'the system lacks a tracr sequence,' because this 'was a substantive and non-obvious functional and structural difference from a system that required a tracr sequence' to function." *Id.* at 13 (quoting Ex. 1002, 7664). According to Petitioner, "Patent Owners' acquiescence to this amendment, along with their other statements made during prosecution to overcome the prior art constitute a clear disavowal of claim scope and limit the claims to those systems that actually function to cleave a target sequence in a eukaryotic cell." *Id.* at 13.

Alternatively, Petitioner argues that "[i]f . . . the Board were to determine that the issued claims do not require any functional aspects, then Petitioner includes additional grounds of unpatentability based on lack of practical utility under 35 U.S.C. § 101 (Ground 6) and obviousness over Schunder (Ground 7)." *Id.* at 14.

In response, Patent Owner argues that each of Petitioner's "two alternative constructions" "is flawed because each directly conflicts with the plain claim language, specification, and prosecution history." Prelim. Resp. 12. Patent Owner argues that Petitioner's "first proposed construction blatantly reads a limitation into the claims," *id.* at 12, and that it and Petitioner's alternative construction "should be rejected as a matter of law," *id.* at 13. Patent Owner argues that, "[i]nstead, the claims should be given their plain and ordinary meaning as reflected in the words of the independent

claims themselves—'designed to hybridize with a target sequence in a eukaryotic cell.'" *Id.*

We agree with Patent Owner. Claim 1 recites an "engineered, non-naturally occurring system comprising" "a Cpf1 effector protein" and "at least one engineered guide polynucleotide." Ex. 1001, 547:49–61. The crux of Petitioner's argument is that the claims should be limited to systems in which the Cpf1 effector protein is designed to cause cleavage of the target sequence. Pet. 11–14. Although claim 1 describes the engineered guide polynucleotide and guide sequence in terms of their intended functions (i.e., the engineered guide polynucleotide is "designed to form a complex with the Cpf1 effector protein," and the guide sequence "is designed to hybridize with a target sequence in a eukaryotic cell"), claim 1 does not similarly specify that the Cpf1 effector protein must be designed to cleave the target sequence. Thus, the plain language of claim 1 does not support Petitioner's argument. *See, e.g., Veritas Techs. LLC v. Veeam Software Corp.*, 835 F.3d 1406, 1411 (Fed. Cir. 2016) (claim construction begins with the plain language of the claims).

Moreover, Petitioner does not persuasively point us to any language in the claims themselves that would restrict the scope of the claims to only Cpf1 effector proteins designed to cause cleavage of the target sequence. For example, the written description of the '490 patent refers to both catalytically active Cpf1 proteins (i.e., proteins that cleave nucleic acids) and catalytically inactive Cpf1 proteins (i.e., proteins that cannot cleave nucleic acids) as Cpf1 "effector proteins." *Compare, e.g.*, Ex. 1001, 3:57–59 ("The invention provides methods of *genome editing* . . . compris[ing] two or more

rounds of Cpf1 effector protein targeting and *cleavage*." (emphases added)), *with id.* at 6:35–48 ("The invention also provides for methods and compositions wherein one or more amino acid residues of the effector protein may be modified, e.g[.], an engineered or non-naturally-occurring effector protein or Cpf1. . . . The *effector protein may not direct cleavage* of one or other DNA or RNA strand at the target locus of interest." (emphasis added)). Thus, the term Cpf1 "effector protein," as recited in the claims, does not compel us to interpret the claims as requiring a cleavage function for that protein.

Turning to the written description, the '490 patent describes the Cpf1 effector protein as having the function of inducing a "*modification* of the sequences associated with or at the target locus of interest." Ex. 1001, 2:47–51 (emphasis added). But, contrary to Petitioner's arguments otherwise, that "modification" is not limited to nucleic acid "cleavage." For example, the '490 patent discloses several Cpf1 effector protein functions that do not include cleavage, such as: "methylase activity, demethylase activity, transcription activation activity, transcription repression activity, transcription release factor activity, histone modification activity," and "nucleic acid binding activity." *Id.* at 7:25–33. And the '490 patent discloses several uses for the CRISPR-Cpf1 system other than for gene editing that requires nucleic acid cleavage—e.g., for fusion or operable linkage to a functional domain, *id.* at 37:14–22; for delivery of functional domains, *id.* at 59:9–23; for RNA-guided protein binding "with little or no target cleavage," *id.* at 59:43–62; for "inducing transcriptional activation or repression," *id.* at 80:51–64; for producing an "inducible Cpf1 CRISPR-Cas

system," *id.* at 90:47–58; for detection methods such as fluorescence in situ hybridization (FISH), *id.* at 156:45–67; and for identifying locations of target sequences via a tagged CRISPR enzyme, *id.* at 172:9–48. Petitioner appears to rely on the notion that these activities are "not the not the focus of the specification." Pet. 12. Even if true, Petitioner has not pointed us to any principle of law that would allow us to read these multiple embodiments out of the scope of the claims. Indeed, we note that the '490 patent describes nucleic acid cleavage as "a preferred embodiment." *Id.* at 3:8–9; *WesternGeco LLC v. ION Geophysical Corp.*, 889 F.3d 1308, 1323–24 (Fed. Cir. 2018) ("It is well established that claims are not limited to preferred embodiments, unless the specification clearly indicates otherwise.").

In addition, the '490 patent specifically discloses engineered Cpf1 effector proteins that, by "mutation of one or more amino acid residues of the effector protein," have "reduced or abolished nuclease activity compared with an effector protein lacking said one or more mutations." *Id.* at 6:38–44. This "effector protein may not direct cleavage of one or other DNA or RNA strand at the target locus of interest." *Id.* at 6:45–46. The written description also identifies these engineered Cpf1 effector proteins as "preferred embodiments": "In a preferred embodiment, the mutation in the FnCpf1p RuvC domain is D917A or El006A, wherein the D917A or E1006A mutation *completely inactivates the DNA cleavage activity* of the FnCpf1 effector protein." *Id.* at 9:21–40 (emphasis added). Because a claim interpretation that excludes a preferred embodiment is "rarely, if ever, correct," *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583 (Fed.

Cir. 1996), the written description of the '490 patent also does not support Petitioner's claim construction.

We turn next to the prosecution history of the application leading to the '490 patent. *See WesternGeco*, 889 F.3d at 1323 ("A patent's specification, together with its prosecution history, constitutes intrinsic evidence to which the Board gives priority when it construes claims."). Disavowal of claim scope can occur when the Patent Owner makes a narrowing amendment to a claim or surrenders claim scope through argument. *Conoco, Inc. v. Energy & Envt'l Int'l, L.C.*, 460 F.3d 1349, 1363 (Fed. Cir. 2006). Here, Petitioner relies on both argument-based disavowal and amendment-based disavowal to argue that Patent Owner disavowed catalytically inactive Cpf1 effector proteins (i.e., proteins lacking nuclease activity). Pet. 12–14. We find neither persuasive.

For argument-based disavowal to apply, the "surrender of subject matter" must be "clear and unmistakable." *Conoco*, 460 F.3d at 1364. Petitioner argues that Patent Owner "expressly disclaimed non-functional systems" in responding to an anticipation rejection. Pet. 12–13 (citing Ex. 1002, 6184). During prosecution, the Examiner rejected certain claims for anticipation over Schunder. Ex. 1002, 6153–55. Specifically, the Examiner found that "Schunder discloses CRISPR-Cas systems identified in *Francisella tularensis* bacteria, which is the putative Cpf1 CRISPR-Cas system." *Id.* at 6154. The Examiner further found that "the *Francisella* bacteria are deemed to inherently comprise the required CRISPR-Cas Cpf1 system." *Id.*

In response, Patent Owner argued that Schunder failed to disclose all the limitations of the claims. *Id.* at 6184. Specifically, Patent Owner argued that Schunder merely "discloses no more than existence in the genome of *F. tulerenis* [sic] sequences proposed to encode putative CRISPR-Cas proteins," "fails to demonstrate that any of the putative components are functional," and "fails to teach or suggest elements needed to engineer an operable *F. tulerenis* [sic] CRISPR-Cas system." *Id.*

Petitioner equates "functional" and "operable" in Patent Owner's prosecution remarks to both hybridization and cleavage functions, but the prosecution history shows that Patent Owner relied on the hybridization function only to distinguish the prior art. *Id.* First, Patent Owner characterized the instant claims as reciting "an engineered guide polynucleotide that is designed to *hybridize* with a target sequence." *Id.* (second emphasis added). Second, Patent Owner argued that "Schunder provides no teaching or suggestion of a *F. tulerenis* [sic] [Protospacer Adjacent Motif], which would be needed to *design functional* guides to *hybridize* to a target of interest." *Id.* (emphases added). These arguments do not rise to the level of a "clear and unmistakable" disavowal of CRISPR-Cpf1 systems comprising Cpf1 effector proteins lacking nuclease activity.

We are similarly unpersuaded by Petitioner's amendment-based disavowal argument. As Petitioner notes, the Examiner required Patent Owner to amend the claims before allowance to recite that the claimed CRISPR system lacks a tracr sequence. Pet. 13 (citing Ex. 1002, 7664). In an Examiner-Initiated Interview Summary, the Examiner wrote that "the lack of tracr sequence was a substantive and non-obvious functional and

structural difference from a system that required a tracr sequence." Ex. 1002, 7664. But nothing in the Examiner's statement or amendment requires the Cpf1 effector protein to function to cleave a target sequence, or demonstrates that the Examiner understood the claims to be limited to a catalytically active Cpf1 effector protein. Instead, the Examiner's Reasons for Allowance indicate that the Examiner relied on the ability of the engineered guide polynucleotide to hybridize to a target sequence in the absence of a tracr sequence:

> The prior art fails to disclose or suggest a system comprising a Cpf1 effector protein, or a sequence encoding a Cpf1 effector protein, and at least one engineered guide polynucleotide, which forms a complex with the Cpf1 effector protein. In particular, the *prior art fails to disclose or suggest such a system that lacks a tracr sequence*. The guide polynucleotide comprises *a guide sequence that is designed to, and will, hybridize to a target sequence* in a eukaryotic cell.

Id. at 7677 (emphases added).

For these reasons, we decline to read the claims narrowly so as to exclude CRISPR-Cpf1 systems comprising Cpf1 effector proteins lacking nuclease activity. We interpret the claims consistent with their plain language, the written description of the '490 patent, and its prosecution history to require a system having a Cpf1 effector protein and a guide sequence designed to hybridize with a target sequence in a eukaryotic cell, but not to require cleavage of the target sequence by the Cpf1 effector protein. Ex. 1001, 547:54–56. No further interpretation of any claim term is necessary. *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) ("[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.").

C. Proposed Grounds of Unpatentability Under 35 U.S.C. § 112

Petitioner argues that claims 1–60 of the '490 patent are unpatentable under 35 U.S.C. § 112 for lack of written description, lack of enablement, and indefiniteness. *See* Pet. 15–51. Patent Owner argues that these grounds of unpatentability are all "based on the Board importing a 'cleavage' limitation into the independent claims." Prelim. Resp. 23. Patent Owner argues that "[i]f the Board rejects Petitioner's construction as a matter of law," then we should reject these grounds of unpatentability as well. *Id.* We agree.

"[T]he petitioner is master of its complaint." *SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1355 (2018). Here, Petitioner premises its § 112 grounds of unpatentability on whether the written description of the '490 patent adequately describes, enables, and defines Cpf1 effector proteins having nuclease (i.e., cleavage) activity, and makes no separate argument that the claims are also unpatentable if construed to not require cleavage.

For example, Petitioner argues that the claims are unpatentable because the written description of the '490 patent "fails to provide any correlation between the structure of the Cpf1 proteins and their *claimed function of successfully cleaving* DNA in eukaryotic cells." Pet. 1 (emphasis added); *see also id.* at 49 (arguing that "[a]bsent positive results from a *DNA cleavage assay*, one skilled in the art would not be able to conclude whether any given Cpf1 protein *does or does not require a tracrRNA*" (emphases added)). Petitioner also argues that the claims lack enablement because "[i]t would take complex iterative testing . . . to identify the genus of Cpf1 proteins that are *functional* within the meaning of the claims," *id.* at 2, and ties that function to examples in the written description measuring nuclease

activity *in vitro* and *in vivo*, *id.* at 29. *See also id.* at 46 (arguing that "*in vitro* cleavage assays" "are the only way to determine whether a given Cpf1 enzyme *does or does not require a tracrRNA for cleavage*," and that these assays are "non-trivial" (emphasis added)). Thus, in every instance, Petitioner ties its unpatentability analysis to the lack of adequate information in the '490 patent demonstrating that a Cpf1 effector protein has nuclease activity. Petitioner presents no argument directing us how to analyze the claims when considering the full scope of the '490 patent's disclosure, which, as discussed above, includes Cpf1 effector proteins that have functions other than nuclease activity. *See SAS Inst.*, 138 S. Ct. at 1358 ("the petition [is] the centerpiece of the proceeding both before and after institution").

In coming to our conclusion, we are cognizant that rejecting Petitioner's *narrower* interpretation of the claims in favor of Patent Owner's *broader* interpretation results in a claim scope that encompasses both Cpf1 effector proteins designed to be catalytically active and Cpf1 effector proteins that do not have catalytic activity. But Petitioner chose not to present any arguments that the challenged claims are unpatentable under this broader interpretation. We decline to parse the Petition to make these arguments for Petitioner. *Cf. Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369 (Fed. Cir. 2016). Thus, Petitioner fails to demonstrate on this record that it is more likely than not that at least one claim of the '490 patent is unpatentable for lack of written description, lack of enablement, or indefiniteness.

D. Proposed Alternative Grounds of Unpatentability

Petitioner argues that, "if . . . the Board were to determine that the issued claims do not require any functional aspects," then claims 1–60 of the '490 patent are unpatentable under 35 U.S.C. § 101 for lack of practical utility and under 35 U.S.C. § 103 for obviousness. Pet. 14; *see also id.* at 51–69. Because we do not so interpret the claims, however, Petitioner fails to demonstrate that it is more likely than not that at least one claim of the '490 patent is unpatentable under these grounds.

For example, as to the ground of unpatentability based on obviousness, Petitioner predicates its arguments on a determination by the Board that "the claims require *no* functional activity." Pet. 55. But, as explained above, the plain language of claim 1 recites "an engineered guide polynucleotide . . . comprising a guide sequence . . . designed to *hybridize* with a target sequence." Ex. 1001, 547:52–56 (emphasis added). Hybridization is a functional activity. And, as to the ground of unpatentability based on lack of practical utility, Petitioner again ties its arguments to a limitation we do not read into the claims—i.e., cleaving the target sequence. *See* Pet. 53 (arguing that "to be useful under § 101, the claimed subject matter must actually function in a eukaryotic cell *to cleave DNA*" (emphasis added)). These alternative grounds fail to address the utility and obviousness of other Cpf1 effector protein functions disclosed in the '490 patent that do not require cleavage, such as, "methylase activity, demethylase activity, transcription activation activity, transcription repression activity, transcription release factor activity, histone modification activity," and "nucleic acid binding activity." Ex. 1001, 7:25–33. Thus,

Petitioner fails to demonstrate on this record that it is more likely than not that at least one claim of the ’490 patent is unpatentable for lack of practical utility or obviousness.

III. CONCLUSION

Taking account of the information presented in the Petition and the Preliminary Response, and the evidence of record, we determine that Petitioner fails to demonstrate that it is more likely than not that at least one claim of the ’490 patent is unpatentable. Accordingly, the Petition is *denied*, and no trial is instituted.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is *denied*, and no trial is instituted.

FOR PETITIONER:

Howard Levine
Amanda Murphy
FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP
Howard.levine@finnegan.com
Amanda.murphy@finnegan.com

William Spruill
BENSON HILL BIOSYSTEMS, INC.
mspruill@bensonhillbio.com

FOR PATENT OWNER:

Steven Trybus
JENNER & BLOCK LLP
strybus@jenner.com

Stephen Maebius
FOLEY & LARDNER LLP
smaebius@foley.com