



Planet Depos®
We Make It *Happen™*

Transcript of Matthew Turk, Ph.D.

Date: July 15, 2026

Case: Samsung Electronics Co., Ltd., et al. -v- Maxell, Ltd. (PTAB)

Planet Depos

Phone: 888.433.3767

Email: transcripts@planetdepos.com

www.planetdepos.com

1 UNITED STATES PATENT AND TRADEMARK OFFICE

2
3 BEFORE THE PATENT TRIAL AND APPEAL BOARD

4
5 SAMSUNG ELECTRONICS CO., LTD. And
6 SAMSUNG ELECTRONICS AMERICA, INC.,
7 Petitioners

8 v.

9 MAXELL, LTD.,

10 Patent Owner

11 Inter Partes Review No.: IPR2025-01315

12 U.S. Patent No. 8,471,950
13

14
15 REMOTELY CONDUCTED DEPOSITION OF

16 MATTHEW TURK, PH.D.

17 WEDNESDAY, JULY 15, 2026

18 12:05 P.M. EST
19

20 JOB NO.: 638178

21 PAGES: 1 - 56

22 REPORTED BY: KARISA EKENSEAIR, CCR RPR RMR RDR

1 DEPOSITION OF MATTHEW TURK, CONDUCTED VIA ZOOM
2 VIDEOCONFERENCE.
3
4
5
6
7
8
9

10 Pursuant to notice, before Karisa J.
11 Ekenseair, Certified Shorthand Reporter in and for
12 the States of Arkansas, Oklahoma, Missouri,
13 Illinois, Tennessee, Georgia, New Mexico,
14 Washington, California, and Texas; National
15 Registered Professional Reporter; National
16 Registered Merit Reporter; National Registered
17 Diplomat Reporter; Notary Public.
18
19
20
21
22

1 A P P E A R A N C E S

2 ON BEHALF OF THE PETITIONERS (VIA ZOOM) :

3 LARISSA BIFANO, ESQUIRE

4 DLA PIPER LLP (US)

5 33 ARCH STREET, 26TH FLOOR

6 BOSTON, MASSACHUSETTS 02110

7 617-406-6000

8

9 ON BEHALF OF THE PATENT OWNER (VIA ZOOM) :

10 MATTHEW A. STANFORD, ESQUIRE

11 MAYER BROWN

12 1999 K STREET, NW

13 WASHINGTON, DC 20006

14 202-263-3000

15

16 ALSO PRESENT:

17 DANIEL LONG, TECHNICIAN

18

19

20

21

22

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22

T A B L E O F C O N T E N T S	
	PAGE
STYLE AND NUMBER.....	1
APPEARANCES.....	3
WITNESS: MATTHEW TURK	
EXAMINATION BY MS. BIFANO.....	5
CERTIFICATE OF REPORTER.....	55

EXHIBITS
(NONE MARKED)

1 P R O C E E D I N G S

2 THE REPORTER: Will counsel please
3 stipulate that in lieu of formally swearing in the
4 witness, the reporter will instead ask the witness
5 to acknowledge that their testimony will be true
6 under penalties of perjury, that counsel will not
7 object to the admissibility of the transcript
8 based on proceeding in this way and that the
9 witness has verified that they are, in fact,
10 MATTHEW TURK, beginning with the noticing
11 attorney, please.

12 MS. BIFANO: Yes, we consent.

13 MR. STANFORD: Yes. We consent as well
14 for patent owner.

15 MATTHEW TURK
16 of lawful age, being first duly sworn, deposes and
17 says in reply to the questions propounded as
18 follows:

19 EXAMINATION

20 BY MS. BIFANO:

21 Q Great. Good morning, Dr. Turk. My name
22 is Larissa Bifano. I'll be taking your deposition

1 today. Hopefully this will go smoothly so
2 let's -- if you have a question, if you don't
3 understand something I'm asking you, please don't
4 hesitate to ask me to clarify. And let's try not
5 to talk over each other so the court reporter gets
6 an easy record and we make her life easier.

7 So and then if you need any breaks, you
8 know, please don't hesitate to ask. You know,
9 typically we'll probably stop around every hour or
10 so as long as the deposition keeps going.

11 So with that, would you please state your
12 full name for the record?

13 A My name is Matthew Alan Turk.

14 Q And where are you currently residing?

15 A 4658 Vintage Ranch Lane, Santa Barbara,
16 California 93110.

17 Q And where are you physically right now?

18 A I'm physically at my home in my office.

19 Q Okay. And that's at the address you just
20 mentioned?

21 A Yes, it is.

22 Q Okay. And what is your current position?

1 A I am an emeritus professor at the
2 University of California Santa Barbara and a
3 consultant.

4 Q Great. Okay. Is the June gloom over yet?
5 How's the weather?

6 A It moved into July.

7 Q Oh, no.

8 A But it's actually very nice right now.

9 Q Great. It's a beautiful place to live.

10 And then in your office right now, what do
11 you have in front of you?

12 A At my desk here, I have a bunch of
13 do-dads. I have my cell phone is sitting in front
14 of me which is -- the screen is off. I have
15 coffee and water. I have a pad of paper. I have
16 a little bit of fruit.

17 Q Are there any documents on your desk?

18 A There's a stack of mail and magazines and
19 things like that. There's nothing that's open.

20 Q No documents related to this matter?

21 A No, they're not.

22 Q Okay. And on your computer, do you have

1 any documents open that are related to this
2 matter?

3 A Everything else is closed right now.

4 Q Okay.

5 A So no, I do not.

6 Q Okay. Perfect. Great. And then you're
7 being compensated for your work in this matter,
8 correct?

9 A I am, yes.

10 Q And what is your hourly rate?

11 A I believe it's 625 an hour for this case.

12 Q And how many hours did you spend on the
13 matter to date, just a ballpark?

14 A I'm not sure that I have a very good
15 ballpark to estimate that.

16 Q Okay. Would you say it's more than 10
17 hours?

18 A Definitely more than 10.

19 Q Less than 100?

20 A Probably, but I don't really have a good
21 sense.

22 Q Okay.

1 A I could look at my records. Be easy to
2 determine.

3 Q Okay. Thank you. And you are retained by
4 Maxell to provide opinions for this IPR; is that
5 right?

6 A That's correct.

7 Q When were you retained by Maxell?

8 A I don't remember exactly. It may have
9 been this past December, but it could have been
10 before then. I'm not sure.

11 Q And are you advising Maxell on both the --
12 this IPR proceeding and the district court
13 litigation or just the IPR proceeding?

14 A So far, just the IPR proceeding.

15 Q Okay. And when Maxell retained you, what
16 specifically did they ask you to do?

17 A To be involved in this IPR proceeding
18 regarding the '950 patent.

19 Q Are you involved in any other of the
20 patents that Maxell has asserted against Samsung?

21 A Yes. I'm involved in the proceeding for
22 the, I believe, '645 patent.

1 Q And how many meetings did you have --
2 strike that.

3 Is Matthew Stanford the counsel you deal
4 with at Mayer Brown for this matter?

5 A Yes.

6 Q And how many meetings did you have
7 with -- with Mr. Stanford to prepare for this
8 deposition?

9 A We had one main meeting on Monday and have
10 talked perhaps a few times in addition to that,
11 maybe including last week, but I'm not sure if it
12 includes last week or not.

13 Q Did anyone else besides Mr. Stanford
14 attend those meetings?

15 A No.

16 Q And you prepared a declaration for this
17 proceeding, correct?

18 A I did. That's right.

19 Q Okay. Did you draft that declaration or
20 did counsel draft the declaration?

21 A We both contributed to it after
22 discussing, you know, the patents and all of the

1 related documents and such in depth and what my
2 key opinions were. We both contributed to
3 the -- the document initially.

4 Q And have you been retained by Maxell
5 before this matter for other matters?

6 A I don't think so.

7 Q Okay. And have you worked with Mayer
8 Brown before this matter?

9 A I have, yes.

10 Q Is there any reason you cannot testify
11 truthfully today?

12 A No. I don't think so.

13 Q Okay. Are there any medications that
14 you're on today that could affect your ability to
15 testify -- provide accurate testimony today?

16 A No.

17 Q Okay. Let's start with Exhibit 2017 which
18 is the joint claim construction statement.

19 MS. BIFANO: Daniel, can you put that in
20 the chat?

21 REMOTE TECHNICIAN: One moment.

22 MS. BIFANO: Thank you.

1 THE REPORTER: Will you want these
2 attached to this transcript? I know they've
3 already been marked.

4 MS. BIFANO: I don't think so. Because
5 they're already part of the record, so --

6 MR. STANFORD: Just with the caveat that
7 if there's anything that hasn't already been
8 marked as an exhibit --

9 MS. BIFANO: Sure.

10 MR. STANFORD: -- or is not a part of the
11 record, then I would like that to be.

12 MS. BIFANO: Yeah.

13 REMOTE TECHNICIAN: Okay. It is in the
14 chat. It does take a moment to load, but you
15 should see it populated. One moment. There you
16 go.

17 Q Let me know when you have it up, Dr. Turk.

18 A Still downloading. Okay. I have it.

19 Q Okay. Do you recognize this document?

20 A Yes, I do.

21 Q And what is it?

22 A It's the joint claim construction and

1 prehearing statement.

2 Q Have you reviewed this document before?

3 A I believe so, yes.

4 Q Okay. And can you turn to page 3 of the
5 document?

6 A Yes.

7 Q Do you see the -- the terms "region
8 creation unit" and "feature detection unit"?

9 A Yes, I do.

10 Q Okay. When you prepared your declaration,
11 did you apply the constructions for "region
12 creation unit" and "feature detection unit" that
13 are written in this document?

14 A I'd have to double-check my declaration to
15 remember for sure, but I believe I applied both
16 this and the definitions that are provided in my
17 declaration.

18 Q Okay. So there's nothing there -- strike
19 that.

20 You have no reason to disagree with these
21 two constructions, "region creation unit" and
22 "feature detection unit" as you stand today,

1 correct?

2 A I think that's correct.

3 And to correct what I said a moment ago, I
4 don't think I did provide separate definitions for
5 these in my declaration, but I could go to the
6 declaration to check for sure.

7 Q Okay.

8 MS. BIFANO: Daniel, would you put in the
9 chat the declaration, which is Exhibit 2015? It's
10 probably going to take forever to --

11 Q But while he's doing that, can I ask you
12 some questions about these particular
13 constructions? You don't need your declaration to
14 answer those.

15 A Sure.

16 Q So looking first at the feature detection
17 unit, does the word "differential" appear anywhere
18 in the construction that's in the right-hand box
19 for feature detection unit?

20 A I do not see that word.

21 Q Okay. Does the phrase "directional
22 differential detection" appear in that

1 construction?

2 A No, it doesn't.

3 Q Does -- does the construction for feature
4 detection unit require comparison of adjacent
5 pixels?

6 A The way that it's described in the '950
7 patent does compare nearby pixels. I'm not sure
8 if I opined in my declaration on whether that's
9 required or not.

10 Q So I'm not asking what's described in the
11 specification of the '950 patent. I'm asking
12 whether this construction that's been agreed to by
13 the parties, whether this requires a comparison of
14 adjacent pixels.

15 A It requires detecting changes which is
16 typically done including adjacent pixels but may
17 not always have to be so.

18 Q So could another way it be done is a
19 temporal change?

20 A I don't believe the patent uses or
21 mentions temporal changes so i would not
22 understand it that way.

1 Q But this -- this claim construction
2 doesn't limit how -- what the change is, does it?

3 MR. STANFORD: Objection, form.

4 A I don't see anything in this construction
5 that declares that it can't be temporal changes.

6 Q Okay. And then does this construction
7 specify -- okay. Strike that.

8 Assuming we're requiring comparison of
9 adjacent pixels, is there anything in this
10 construction that would specify a particular
11 direction of that comparison, such as horizontal
12 or vertical?

13 A I don't see anything in the construction
14 that would limit that, no.

15 Q Okay. Does the construction require any
16 level of positional holding?

17 A Excuse me, any what?

18 Q Positional holding, like holding of a
19 position?

20 A The construction does not mention holding,
21 no.

22 Q Okay. All right. Do you have your -- can

1 you access your declaration in the chat?

2 A I just clicked on it so it's loading now.

3 Q Okay. Let me know when you have it.

4 A Okay.

5 MS. BIFANO: And, Daniel, while we're
6 waiting, you can upload Exhibit 1001, 1005, 1007,
7 and 1006 into the chat?

8 A Okay. I have it now.

9 Q Okay. Great. Could you please turn to
10 paragraph 59 which is on page 20 of your
11 declaration?

12 A Okay.

13 Q Okay. And in paragraph 59, in your first
14 sentence you say, "In my opinion, Tsujino's
15 approach is fundamentally different from that of
16 the '950 patent."

17 Do you see that?

18 A Yes.

19 Q What did you mean when you said that
20 Tsujino's approach is fundamentally different from
21 the '950 patent?

22 A Well, I describe that in the rest of the

1 paragraph, mentioning how Tsujino -- Tsujino
2 operates and what it doesn't do that the '950
3 patent claims require.

4 Q Okay. So can you tell me -- can you give
5 me an example of one thing that Tsujino -- strike
6 that.

7 Can you give me one example of one thing
8 in the claim that Tsujino does not teach, focusing
9 on claim 1, I would say, of the '950 patent?

10 A Tsujino does -- doesn't perform
11 the -- actually, can I -- can I look at the '950
12 patent to get the exact language of the claim?

13 Q Sure. So that's Exhibit 1001.

14 A Okay. I know it's also earlier in my
15 declaration.

16 Q Yeah. But it's probably just easier to
17 pull it up. It should be in the chat.

18 A Oh, okay. Okay. I have that.

19 What paragraph are we on, again, in my
20 declaration?

21 Q Sorry. Paragraph 59, page 20.

22 A Okay. So to answer the question, one

1 thing that Tsujino does not do that the patent
2 does is detecting a position where features of
3 pixels have changed.

4 Q And where is that required in the claim?

5 A Claim [1a].

6 Q Is there anything else that Tsujino does
7 not do -- does not teach?

8 A Probably several things, but another
9 example is the creation of the regions as defined
10 as -- as described in claim 1, the value --
11 estimated value extraction regions.

12 Q Okay. Going to feature -- the -- sorry.
13 Strike that.

14 Going to limitation [1a], this feature
15 detection unit, in your declaration at
16 paragraph 59, you say that Tsujino does not
17 perform the per-pixel directional-differential
18 detection or positional holding contemplated by
19 the '950 patent claims.

20 Do you see that?

21 A Yes, I do.

22 Q Where are those features recited in

1 limitation [1a] of claim 1 of the '950 patent?

2 A Well, [1a] describes a feature detection
3 unit which detects a position where features of
4 each pixel of an input picture signal have
5 changed. And the specification describes this as
6 a directional-differential detection. So I'm
7 describing what I believe the '950 patent
8 discloses.

9 Q Can you please turn to page 9 of your
10 declaration, paragraph 24?

11 A Okay.

12 Q Do you see the last sentence that says, "I
13 understand that it is improper to import
14 limitations from the specification into a patent
15 claim through claim construction"?

16 A Yes, I do.

17 Q Okay. If that's true and you cannot
18 import limitations from the specification into a
19 claim through claim construction, why is it
20 appropriate for you here to read in the
21 directional-differential detection that's
22 described in the '950 specification into claim 1

1 of the '950 patent?

2 A And "here" is where?

3 Q Oh, in response to your -- the last
4 question I had where you said -- hold on. Let me
5 -- let me rephrase the question.

6 If it's true that you cannot import
7 limitations from the specification into a claim
8 through claim construction, what basis do you have
9 in your declaration at paragraph 59 to require
10 that the claim -- that the differential detection
11 that's described in the '950 specification should
12 be read into claim 1 of the '950 patent?

13 MR. STANFORD: Objection, form.

14 A In paragraph 59, I'm providing an overview
15 of the Tsujino reference in that section. And in
16 that paragraph in particular, I'm giving an
17 example of some things that Tsujino does not do
18 that the '950 patent does.

19 Q The '950 specification does, correct?

20 A I don't think I say here whether I'm
21 particularly focusing on claim language or the
22 patent as a whole, but I'm talking about the

1 approach in general.

2 Q But is there anything in the claim of
3 the -- claim 1 of the '950 patent that requires
4 directional-differential detection?

5 A The language of claim 1 does not include
6 directional-differential detection. But that is a
7 way and that is a way that the spec informs what
8 the '950 patent is doing. And it is a difference
9 with what Tsujino does.

10 Q Let's -- can you pull up Exhibit 1005,
11 which is Tsujino. We're going to move into
12 Tsujino now. Let me know when you have it.

13 A I have it.

14 Q Okay. So can you -- what is Exhibit 1005?

15 A It's the '850 patent by Tsujino about --
16 about autofocus lens control.

17 Q Okay. Have you reviewed it before?

18 A Excuse me, have I what?

19 Q Reviewed -- have you read it before?

20 A Yes, I have.

21 Q Okay. And did you -- you did that in
22 conjunction with preparing your declaration,

1 right?

2 A I did it prior to beginning to prepare my
3 declaration, but, yes, also in conjunction.

4 Q Okay. All right. So I want to talk a
5 little bit about what Tsujino teaches.

6 Can you please turn to column 11 line 64
7 to 67?

8 A Yes.

9 Q Let me know when you're there.

10 A I'm there.

11 Q Okay. Do you see that it discusses doing
12 a raster scan -- or I should say, "is updated in a
13 raster scanning direction"?

14 A I see that phrase.

15 Q What does that phrase mean to you as one
16 of ordinary skill in the art?

17 A It means that it's doing something,
18 depending on the context here, row by row and line
19 by line. So horizontally and vertically
20 throughout the whole image.

21 Q Okay.

22 A Or at least in that direction.

1 Q Got it. So would you say that Tsujino is
2 moving through the image systematically across the
3 same positions one at a time from coordinates 1,1
4 to 8,8, for example?

5 A So this is describing Figures 11, 13, and
6 14, I think. So in the context of those figures,
7 it's -- it's doing something in that fashion
8 in -- in that direction. It's updating coordinate
9 values in that manner, row by row and column by
10 column.

11 Q Okay. And then looking up the column a
12 bit at lines 24 to 31, do you see how it refers to
13 a current pixel and evaluates whether or not the Y
14 data value of the current pixel exceeds TH1?

15 A I'm sorry, in the same column, 11?

16 Q Yeah. Same column, column 11.

17 A Can you please repeat the question?

18 Q Sure. Do you see how it refers to a
19 current pixel and an evaluation of whether or not
20 the Y data value of the current pixel exceeds TH1?

21 MR. STANFORD: Objection, form.

22 A Yes. I see that.

1 Q So at each pixel position, Tsujino is
2 evaluating whether the Y data value exceeds the
3 threshold TH1, correct?

4 A I believe that's correct.

5 Q Okay. And then moving on from that,
6 Tsujino checks whether the luminance value exceeds
7 TH1; is that right?

8 A Can you clarify? I think in this question
9 you asked about the luminance value in particular.
10 What was the value you were referring to in the
11 previous question? Was it also the luminance
12 value?

13 Q It was the Y data value.

14 A So that is the luminance value, so I'm
15 trying to understand --

16 Q Okay.

17 A -- what question you're asking
18 differently.

19 Q Okay. Let's just do this. Is the Y data
20 value the luminance value of the pixel?

21 A Generally, yes. I don't recall if -- if
22 this patent calls it anything different or it

1 might call it multiple things or whatever, but, in
2 general -- in general, yes, the Y value is the
3 luminance value.

4 Q Okay. Great. And then, the next step
5 that Tsujino does is it's, any pixels whose
6 luminance or Y data value exceeds TH1 then are
7 excluded from the focus evaluation; is that right?

8 A Where are you looking at?

9 Q I'm looking at 12, 41 to 58?

10 A So I think your question was, does this
11 section describe excluding every pixel that has a
12 Y value greater than the threshold. And I would
13 say no, this does not describe that.

14 Q What does it describe then?

15 A It describes partial images, which I
16 believe he was referring to the -- the grids that
17 Tsujino defines being the unit of potential
18 exclusion; that is, does that partial image have a
19 luminance exceeding the threshold or not, not does
20 any particular pixel or all of the pixels exceed
21 the threshold.

22 Q So you're saying the exclusion referenced

1 in column 12 is not pixel by pixel; it's region by
2 region?

3 A The wording starting with line 41 talks
4 about the excluding function for excluding the
5 partial image having a luminance exceeding TH1.
6 So yes, it's not about individual pixels.

7 Q Well, is a pixel part of an image?

8 A A pixel is part of an image, yes. But
9 this passage is talking about a partial image
10 having a luminance exceeding a certain threshold,
11 not the individual pixels in that partial image.

12 Q And where does the '850 patent say that a
13 partial image has to be more than a pixel?

14 A I would have to look in more detail at the
15 patent right now to recall what it says about that
16 specifically. But it describes, in general, a
17 grid-based structure and each element of the grid
18 has multiple pixels in it. So there might be more
19 technical details to back that up, but I don't
20 know where they are at the moment.

21 Q Can I direct your attention to Figure 12
22 of the '850 patent?

1 A Yes.

2 Q Let me know when you're there.

3 A I'm there.

4 Q Do you see how in Figure 12, it has a
5 flowchart that starts with "Start Pixel?"

6 A I do see that, yes.

7 Q Doesn't this imply that the analysis is
8 being done on a pixel-by-pixel basis?

9 MR. STANFORD: Objection, form.

10 A What I believe it's showing is that to
11 determine the luminance value for that grid
12 element, a partial image I believe it's called,
13 you have to use the -- all of the pixels in that
14 portion to make that determination. So yes,
15 pixels values are used in determining the partial
16 image luminance value.

17 But what we looked at earlier is referring
18 to the luminance value of the partial image, not
19 the luminance value of the individual pixels in
20 that partial image.

21 Q All right. So let's look at Exhibit 1007
22 which is Iwasaki. Let me know when you're there.

1 A Okay. I'm there.

2 Q Okay. So let's look at -- and then -- in
3 your declaration in -- sorry, making you sort
4 through different documents, but on -- in
5 paragraph 63, you say that "...Iwasaki's
6 grouping-and-luminance-averaging approach is
7 technologically distinct from the pipeline of the
8 '950 patent."

9 Do you remember saying that?

10 A Yes, I do.

11 Q Okay. What did you mean by that?

12 A In general, I mean that Iwasaki has a very
13 different approach than the '950 patent and I
14 described it as grouping-and-luminance-averaging
15 approach because it does those things and it
16 doesn't do those other things that I
17 mentioned -- that I mention in this sentence as
18 well.

19 Q The per-pixel feature change positions in
20 forming a new extraction region; is that right?

21 A That's what I meant, yes.

22 Q Okay. And then what do you mean by the

1 pipeline of the '950 patent in this paragraph?

2 A I mean, generally, the process of steps
3 that the '950 patent takes to achieve its goals.

4 Q Okay. So is your issue with Iwasaki
5 reading on the claim 1 of the '950 patent that it
6 identifies high-luminance regions and is not
7 identifying high-luminance pixels?

8 MR. STANFORD: Objection, form.

9 A I guess that would be one difference.

10 Q Okay. What -- can you give me another
11 difference?

12 A I don't believe Iwasaki has a feature
13 detection unit or procedure. I don't think it
14 detects positions where features have changed. I
15 don't think it has a region creation unit. At
16 least those differences.

17 Q Okay. So would you agree that -- so
18 Iwasaki identifies this high-luminance content,
19 correct? I'm not -- I'm not asking you whether
20 it's pixel or region, but it identifies some
21 grouping of pixels that is high luminance; is that
22 right?

1 A In general, yes.

2 Q Okay. And then Iwasaki excludes that
3 grouping from evaluation; is that correct?

4 A It may exclude it. There's some maybe
5 different logic for different embodiments in
6 Iwasaki. Sometimes it's using the highest to then
7 look for the second highest and make a decision
8 based on that. But, in general, it does things
9 like that, yes.

10 Q Okay. Because it's looking to exclude
11 very, let's say, for example, very bright pixels
12 that would affect the exposure calculations for
13 the image; is that right?

14 A In particular regions with bright pixels,
15 but, yes.

16 Q Okay. And assuming Iwasaki excludes, as
17 you say, a region with bright pixels from its
18 calculation, why does that not meet the '950
19 claim's requirement of creating a region by
20 removing pixels?

21 MR. STANFORD: Objection, form.

22 A Because it doesn't do that. I don't

1 believe Iwasaki creates regions by removing
2 pixels. It does an initial segmentation and makes
3 decisions based on the areas or regions of that
4 initial segmentation. I don't believe it --

5 Q Okay.

6 A -- creates new regions.

7 Q What does it mean to you to create a
8 region by removing pixels?

9 A I would say typically it would mean to
10 create an explicit representation of what this
11 area of the image is now that you've removed
12 certain pixels or groups of pixels.

13 Q Okay. So say I took an image and I
14 divided it into four regions, okay. And I removed
15 the first region because I found some bright
16 pixels in that region.

17 Have I created a new region with regions
18 2, 3, and 4?

19 A I don't think so. I think you could
20 easily create a new region with regions 2, 3, and
21 4 but I don't think you've done that yet.

22 Q Why not?

1 A Because you haven't -- you haven't
2 mentioned it. You -- you haven't proposed
3 anything that defines this new region or describes
4 this new region. Taking something away
5 doesn't -- is not equivalent to creating something
6 new.

7 Q But if I -- again, back to there's four
8 regions. I decide to exclude region 1 and send
9 only 2, 3, and 4's data to my processor to
10 calculate certain metrics about the image.

11 Haven't then I selected a region which
12 comprises 2, 3, and 4?

13 A What you just described, you have selected
14 three regions, 2, 3, and 4, to pass on to
15 processing, but you haven't described to me
16 creating a new region that you've passed on to
17 processing.

18 Q Going back to Exhibit 2017, which is the
19 construction for region creation unit, where does
20 it say it has to be a new region?

21 A I don't think the word "new" is in there.

22 Q Okay. In this function, it says it's

1 creating a region by removing pixels, right?

2 A It says more than that. It does say that,
3 but it also is saying it's -- it's describing
4 requirements of those pixels that are being
5 removed.

6 In other words, it's not just by removing
7 any pixels. It's removing pixels with the
8 detected features from an evaluated value
9 extraction region.

10 Q Okay. So, again, back to 1, 2, 3, 4. I
11 determine that in section 1, there are pixels that
12 have detected features from an evaluated value
13 extraction region.

14 Can you -- are you with me with that?

15 A I -- I can agree that you just said you
16 did that, yes.

17 Q Okay. So I did do that. And then
18 I -- what happens then if I say I'm creating a new
19 region which is 2, 3, and 4, and I'm doing that by
20 removing those pixels in region 1 for
21 consideration by my processor?

22 MR. STANFORD: Objection, form.

1 A And -- and so what's the question about
2 that?

3 Q Isn't that creating a region by removing
4 pixels?

5 A No. I would say it's removing a region.

6 Q But the claim requires that the creation
7 of the region is done by removing pixels, yes?

8 A That's right.

9 Q So then if I remove the pixels in region
10 1, haven't I removed pixels to create a new
11 region?

12 A I would say still no. You've removed
13 pixels and -- and you've maybe removed a region
14 and you have three left, but I don't think that's
15 creating a region.

16 Q Why not?

17 A I think it's just a different thing.

18 Q What in the claim -- what claim language
19 or construction language are you relying on to say
20 that that does not meet creating a new region -- a
21 region by removing pixels?

22 A The phrase "creating a region." You have

1 not described creating a region to me. You've
2 described removing pixels.

3 Q But the -- but the function says it's
4 creating a region by removing pixels. So what
5 more do you need to be doing besides removing
6 pixels to create the region?

7 A It doesn't list, you know, what else might
8 be needed, but I don't believe that language is
9 equating creating a region and removing pixels.
10 That's -- removing pixels is something that's done
11 in creating the region, but it's not the same
12 thing necessarily.

13 Q Okay. What examples does the '950 patent
14 give of how to create a region?

15 A The examples in Figures 4 and 5, for
16 example.

17 Q Can you explain those to me?

18 A Yes. The left-hand column show three
19 examples of problematic pixels in some sense, or
20 pixels that we don't want involved in the
21 determining-a-value process.

22 The middle column shows the features that

1 have been detected. And the right-hand column
2 shows the creation of regions 16, 17, 18, and 19
3 based on those detected features.

4 And so, to get to these regions, 16, 17,
5 18, or 19, those are created regions by removing
6 pixels that had been detected.

7 MS. BIFANO: We've been going about an
8 hour. Would this be a good time to take a break?

9 THE WITNESS: It's fine.

10 MS. BIFANO: Okay. So do you want to come
11 back -- let's come back at 10 passed. Does that
12 work?

13 THE WITNESS: Yes.

14 MS. BIFANO: All right. Let's go off the
15 record.

16 THE REPORTER: We're off.

17 (Whereupon a break was had.)

18 BY MS. BIFANO:

19 Q Dr. Turk, I want to go back to Tsujino,
20 okay?

21 A Okay.

22 Q So as we discussed, Tsujino evaluates the

1 pixels and compares them to a threshold level,
2 TH1; is that right?

3 A It's one of the things it does, yes.

4 Q Okay. And can you explain to me why you
5 think that that does not meet the claim language
6 of detecting a position where features of each
7 pixel of the input picture signal have changed?

8 A Well, broadly because it's not detecting a
9 position of change. It's actually counting the
10 number of pixels in a certain area that are above
11 a threshold and then using that count to determine
12 something.

13 Q Where are you referring to in Tsujino for
14 that? Are you referring to column 12 or column
15 11?

16 A It's probably throughout Tsujino, but I
17 can try to find something specific about it.

18 So starting in column 11 line 22, it's
19 describing one of these processes in general.

20 Q So what does it mean to you -- what would
21 meet detecting a position of change as you said in
22 your last answer? That's an example of how that

1 would be done?

2 A A good example of how that would be done
3 is shown in Figure 2 of the '950 patent.

4 Q Can you explain that to me?

5 A Yeah. In the image or image section in
6 the above left, there is a region label 10 that is
7 problematic for some reason. It may be a bright
8 spotlight or could be something else that
9 shouldn't be involved in the calculation of the
10 eventual value.

11 And to detect this, it looks for features
12 and the -- the way this -- these plots on -- below
13 and to the right of that image, show filters are
14 applied that result in detected positions,
15 particular pixel positions where a feature is
16 detected. That's very different from what we just
17 talked about in Tsujino which is just counting the
18 number of pixels in an area that are above a
19 threshold.

20 Q But doesn't Tsujino still do a comparison
21 at each pixel for whether that pixel's above or
22 below the threshold?

1 A For each pixel, it determines whether that
2 pixel is above or below a threshold and then uses
3 that decision, that output, to decide whether to
4 count or not that pixel.

5 Q Okay. But so starting with -- so for each
6 pixel, it determines if it's above or below a
7 threshold.

8 So say you had a pixel at spot 1,1 in a
9 grid and it was below a threshold, the threshold,
10 and then the next -- the pixel next to it is 1,2
11 and it's above a threshold. So isn't that then
12 detecting a change because you have one that's
13 below and then the adjacent one is above?

14 MR. STANFORD: Objection, form.

15 A I imagine you could add something to
16 detect that change you just described, but Tsujino
17 doesn't do that. Tsujino merely just counts the
18 pixels above the threshold.

19 Q Okay. All right. So move -- let's talk
20 about Shui. We haven't talked about Shui yet. So
21 that is Exhibit 1006.

22 A I have it.

1 Q Okay. What -- what is Shui directed to?

2 A A method of doing autofocus for a camera.

3 Q Okay. And Shui discloses computing a
4 differential between photometric values in
5 positions before and after a peak; is that right?

6 A Yes. I think that's correct.

7 Q Okay. And then for example, at
8 paragraph 7 to 8 of Shui, it describes calculating
9 the differential delta Y 1-2 and comparing it to
10 allowed value alpha; is that right?

11 If you want to look at the paragraphs, we
12 can --

13 A Generally, that's right, yes.

14 Q Okay. And then in another embodiment
15 that's at Shui 134 to 138, Shui compares peak
16 positions across different areas A, B, and C, and
17 excludes greatly disturbed areas from the focused
18 evaluation; is that right?

19 A So can you repeat the question, please?

20 Q Sure. In another embodiment that's at
21 Shui 134 to 138, Shui compares peak positions
22 across different areas, for example A, B, and C,

1 and excludes greatly disturbed areas from the
2 focused evaluation, right?

3 A Yes. That's right.

4 Q Okay. So taking Shui as a whole, it
5 teaches computing a differential to assess a
6 change and then excluding regions based on that
7 result; is that right?

8 A It uses photometric values which might be
9 averaged in a certain area, not necessarily
10 individual pixels, to determine which focal
11 estimation values to use to determine the
12 autofocus setting. So I don't think that's
13 exactly what you asked but that's what I would say
14 that it does there.

15 Q Okay. So in your mind, what is the
16 difference between the photometric values and the
17 individual pixel values you were discussing
18 earlier -- in the last hour?

19 A Photometric values, I'd have to look to
20 see if it's required or just possible, but the
21 photometric values are at least typically multiple
22 pixel values averaged together as opposed to an

1 individual pixel.

2 Q Sorry, I hope you don't hear my dog
3 barking?

4 A Just a little.

5 Q Okay. And then looking back at the
6 feature detection unit construction, it says that
7 it requires analyzing pixel data to detect changes
8 in image features, right?

9 A I'm sorry, could you tell me where you're
10 referring to?

11 Q I'm sorry, we're going back to the
12 Exhibit 2017, the claim construction.

13 A Okay. And please ask again.

14 Q Sure. So it says there's a -- the feature
15 detection unit requires analyzing pixel data to
16 detect changes in image features.

17 Do you see that? It's in the structure.

18 A Oh, yeah. Yes. I see that.

19 Q Does it -- does this construction require
20 any particular mathematical technique for
21 detecting those changes?

22 A The construction doesn't mention any

1 particular mathematical technique, no.

2 Q Okay. So now we're going to talk a little
3 bit about the combination of references, in
4 particular Tsujino and Shui.

5 So you -- you -- we've discussed that
6 Tsujino analyzes pixels one at a time in this
7 raster scan order, right?

8 A Tsujino counts pixels in the raster scan
9 order, yes.

10 Q Okay. But it does have access to the
11 luminance value at each pixel, correct?

12 A Yes. It does use those values.

13 Q Okay. And that Shui, the second
14 reference, does -- discloses computing a
15 differential between photometric values at
16 positions before and after a peak, right?

17 A I don't recall if it uses that word or
18 describes it that way -- well, I guess it does.
19 Calculated differential Ys. So please repeat the
20 question.

21 Q Sure. So you agree that Shui discloses
22 computing a differential between photometric

1 values at positions before and after a peak,
2 correct?

3 A It does, yes.

4 Q Okay. And a differential, you'd agree, is
5 a mathematical operation that computes the
6 difference between two values, right?

7 A Yes. That's right.

8 Q Okay. And Tsujino at each pixel position,
9 we have a luminance value, correct?

10 A Yes. That's correct.

11 Q Okay. So then if there's an adjacent
12 pixel to that initial pixel, there would be a
13 luminance value for that pixel as well, correct?

14 A There should be.

15 Q Okay. So using known differential
16 techniques, a person of ordinary skill in the art
17 could compute the difference between those two
18 luminance values, correct?

19 A The two side-by-side luminance values?

20 Q Yes.

21 A I suppose someone could do that. I don't
22 believe Shui does that.

1 Q No. Okay. Was there any barrier to doing
2 that? Is there no -- like, is there something
3 that you would say would tell someone not to do
4 that type of calculation?

5 A In general or in the context of Shui?

6 Q Why don't we do both. Let's start with in
7 general and then in the context of Shui.

8 A Well, I guess it would depend on what
9 one's goal is. But absent any particular purpose
10 or goal, computing functions based on pixel
11 values, any pixel values, is -- is very common.

12 Q Is there any teaching in Shui that teaches
13 against applying its differential technique -- its
14 differential technique to spatial pixel
15 comparisons rather than focal range comparisons?

16 A Can you repeat that, please?

17 Q Sure. Is there anything in Shui that
18 teaches away or against applying its differential
19 technique for focal range comparisons to spatial
20 pixel comparisons?

21 A I'd have to look in detail to Shui
22 to -- to answer that accurately. But broadly, I

1 don't think it would make any sense to do that in
2 Shui, but I don't recall if Shui mentions it or
3 not.

4 Q Well, I'm not asking if Shui -- what
5 you're saying, it wouldn't make any sense that you
6 couldn't apply it to a spatial technique?

7 A To me --

8 MR. STANFORD: Objection.

9 A -- it wouldn't make any sense to apply it
10 to a spatial technique in the context of Shui.

11 Q And why is that?

12 A Because Shui is -- is all about finding
13 the right location of the focusing lens and it
14 would not help with that.

15 Q Okay. So let's look at your declaration.
16 Can you look at paragraph 86 of your declaration?
17 That is on page 29.

18 A I see it.

19 Q Okay. So you say, "If exposure-control
20 techniques like those of Iwasaki were generally
21 complementary to Tsujino's autofocus approach,
22 those techniques could have been incorporated into

1 Tsujino."

2 Do you see that?

3 A I do, yes.

4 Q What did you mean by that?

5 A Just generally that at the time of
6 Tsujino, Tsujino's filing, Iwasaki was already
7 known. And Iwasaki's invention could have been
8 used in Tsujino.

9 Q So you're saying there was no barrier
10 to -- for Tsujino to -- to implement Iwasaki's
11 invention in their product or process?

12 A That's not what I'm saying there.

13 Q Okay.

14 A I am just saying that if they are actually
15 complementary, it could have been incorporated,
16 but it wasn't.

17 Q So I mean, just because an inventor chose
18 to describe one approach to solving a problem,
19 does that mean that any approaches, even if they
20 would -- could have been an obvious variation,
21 they wouldn't be obvious over that, just because
22 they didn't list it?

1 MR. STANFORD: Objection, form.

2 A I don't think it means that.

3 Q Okay. What does it mean? I'm having
4 trouble understanding. It sounds like you're
5 saying, yeah, you can't combine these two
6 references because they were around at the same
7 time and they could have incorporated each other
8 and they didn't so, therefore, you can't combine
9 them now.

10 A In the sentence you're pointing to, I'm
11 just stating the fact that Iwasaki was available,
12 was published at the time of Tsujino, and Tsujino
13 did not incorporate Iwasaki into its application.

14 Q Okay. Got it. Okay.

15 So would you agree that Tsujino is
16 directed to a digital camera autofocus system?

17 A Yes.

18 Q Okay. Would you agree that Shui is also
19 directed to a digital camera autofocus system?

20 A Yes.

21 Q Would you agree that Tsujino addresses the
22 problem of high-luminance light sources and

1 images?

2 A Yes.

3 Q And Shui also addresses the problem of
4 high-luminance light sources and images?

5 A Yes, it does.

6 Q So both Tsujino and Shui address the
7 problem of high luminance light sources
8 interfering with autofocus; is that correct?

9 A Generally, yes.

10 Q Okay. So why wouldn't someone of ordinary
11 skill in the art combine these references?

12 A They both solve a similar problem or
13 address similar problems and I don't see that
14 either expresses a need for something that the
15 other one has.

16 Q Okay.

17 A So I'm not sure why one would consider
18 combining just different approaches to a similar
19 problem.

20 Q But you would agree that each reference
21 just takes a different approach to solving the
22 same problem; is that right?

1 A I don't know if it's exactly the same
2 problem.

3 Q Okay.

4 A Certainly closely related problems.

5 Q Okay. Sorry, I'm just looking through my
6 out line. Give me a minute.

7 MS. BIFANO: Can we take a 15-minute
8 break.

9 THE WITNESS: Sure.

10 THE REPORTER: Okay.

11 (Whereupon a break was had.)

12 BY MS. BIFANO:

13 Q Dr. Turk, in your declaration, could you
14 look at paragraphs 103 to 105, please? This is on
15 page 36.

16 A Okay.

17 Q Let me know when you're there.

18 A I'm there.

19 Q Okay. So this is addressing -- we've been
20 talking about limitations [1a] and [1b] and this
21 is addressing 1f. Okay.

22 So your argument on Element [1f] is

1 because the prior art allegedly does not satisfy
2 Elements [1a] and [1b], it necessarily cannot
3 satisfy [1f]; is that true? Is that a fair
4 summary of your argument?

5 A Yes. I think so.

6 Q Okay. Is there anything else in [1f] that
7 is not met by the prior art besides the
8 limitations of [1a] and [1b]?

9 A Yes. The evaluated value of a region from
10 which pixels having an extracted predetermined pix
11 -- feature, excuse me, I would say that whole
12 phrase is not satisfied in the Tsujino-Iwasaki
13 combination.

14 Q And why not?

15 A Because I don't think they have a region
16 from which pixels having an extracted
17 predetermined feature.

18 Q But is that -- is that because you think
19 the art doesn't satisfy Limitation [1b] for the
20 region creation unit?

21 A Yes.

22 Q Okay. Great.

1 MS. BIFANO: Okay. Well, with that, I
2 have no further questions.

3 MR. STANFORD: Give me, like, two minutes
4 and then I'll hop back on and tell you whether or
5 not I have any questions.

6 MS. BIFANO: Okay.

7 (Whereupon a break was had.)

8 MR. STANFORD: I have no further
9 questions. I have no questions.

10 THE REPORTER: Counsel, can I get
11 transcript orders, please? I believe I actually
12 already have orders for you, Ms. Bifano.

13 MS. BIFANO: Great. Perfect.

14 THE REPORTER: Yeah. Pressure off.

15 Mr. Stanford.

16 MR. STANFORD: Can we -- yes, for patent
17 owner's side, can we get a rough draft, honestly.
18 And can we -- when -- have you already agreed on
19 when the final is going to come out? Just
20 curious.

21 THE REPORTER: Yes. They have ordered
22 expedited seven days, so it would be the 22nd.

1 MR. STANFORD: Okay. That's fine with us,
2 but if you could just send over the rough today,
3 that would be great.

4 (Whereupon the proceedings were concluded at
5 1:56 p.m. EST)

6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22

1 CERTIFICATE OF SHORTHAND REPORTER - NOTARY PUBLIC

2
3 I, Karisa Ekenseair, Certified Reporter
4 and Notary Public within and for the State of
5 Arkansas do hereby certify: That MATTHEW TURK,
6 the witness whose deposition is hereinbefore set
7 forth, was duly sworn by me before the
8 commencement of such deposition and that such
9 deposition was taken before me and is a true
10 record of the testimony given by such witness.

11 I further certify that the adverse party,
12 PATENT OWNER was represented by counsel at
13 the deposition.

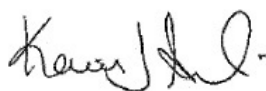
14 I further certify that the deposition of
15 MATTHEW TURK, occurred virtually on July 15, 2026,
16 commencing at 12:05 P.M. EST to 1:56 P.M. EST.

17 I further certify the inspection,
18 reading and signing of said deposition was not
19 discussed. I further certify that I am not
20 related to any of the parties to this action by
21 blood or marriage, I am not employed by or an
22 attorney to any of the parties to this action, and

1 that I am in no way interested, financially or
2 otherwise, in the outcome of this matter.

3
4 IN WITNESS WHEREOF, I have hereunto set my
5 hand and affixed notary my seal this 22nd day of
6 July, 2026.

7 My commission expires: 6-18-2028

8 
9

10 Karisa Ekenseair, CCR, RPR RMR RDR
11
12
13
14
15
16
17
18
19
20
21
22

A			
ability 11:14 about 14:12, 21:22, 22:15, 22:16, 23:5, 25:9, 27:4, 27:6, 27:9, 27:15, 33:10, 35:1, 37:7, 38:17, 39:17, 40:20, 44:3, 47:12, 51:20 above 38:10, 39:6, 39:18, 39:21, 40:2, 40:6, 40:11, 40:13, 40:18 absent 46:9 access 17:1, 44:10 accurate 11:15 accurately 46:22 achieve 30:3 acknowledge 5:5 across 24:2, 41:16, 41:22 action 55:20, 55:22 actually 7:8, 18:11, 38:9, 48:14, 53:11 add 40:15 addition 10:10 address 6:19, 50:6,	50:13 addresses 49:21, 50:3 addressing 51:19, 51:21 adjacent 15:4, 15:14, 15:16, 16:9, 40:13, 45:11 admissibility 5:7 adverse 55:11 advising 9:11 affect 11:14, 31:12 affixed 56:5 after 10:21, 41:5, 44:16, 45:1 again 18:19, 33:7, 34:10, 43:13 against 9:20, 46:13, 46:18 age 5:16 ago 14:3 agree 30:17, 34:15, 44:21, 45:4, 49:15, 49:18, 49:21, 50:20 agreed 15:12, 53:18 alan 6:13 all 10:22, 16:22, 23:4, 26:20, 28:13, 28:21, 37:14, 40:19, 47:12 allegedly 52:1	allowed 41:10 alpha 41:10 already 12:3, 12:5, 12:7, 48:6, 53:12, 53:18 also 3:16, 18:14, 23:3, 25:11, 34:3, 49:18, 50:3 always 15:17 america 1:6 analysis 28:7 analyzes 44:6 analyzing 43:7, 43:15 another 15:18, 19:8, 30:10, 41:14, 41:20 answer 14:14, 18:22, 38:22, 46:22 any 6:7, 7:17, 8:1, 9:19, 11:10, 11:13, 16:15, 16:17, 26:5, 26:20, 34:7, 43:20, 43:22, 46:1, 46:9, 46:11, 46:12, 47:1, 47:5, 47:9, 48:19, 53:5, 55:20, 55:22 anyone 10:13 anything 12:7, 16:4, 16:9, 16:13,	19:6, 22:2, 25:22, 33:3, 46:17, 52:6 anywhere 14:17 appeal 1:3 appear 14:17, 14:22 appearances 4:4 application 49:13 applied 13:15, 39:14 apply 13:11, 47:6, 47:9 applying 46:13, 46:18 approach 17:15, 17:20, 22:1, 29:6, 29:13, 29:15, 47:21, 48:18, 50:21 approaches 48:19, 50:18 appropriate 20:20 arch 3:5 area 32:11, 38:10, 39:18, 42:9 areas 32:3, 41:16, 41:17, 41:22, 42:1 argument 51:22, 52:4 arkansas 2:12, 55:5 around 6:9, 49:6 art 23:16, 45:16, 50:11, 52:1,

Transcript of Matthew Turk, Ph.D.
Conducted on July 15, 2026

58

52:7, 52:19 asked 25:9, 42:13 asking 6:3, 15:10, 15:11, 25:17, 30:19, 47:4 asserted 9:20 assess 42:5 assuming 16:8, 31:16 attached 12:2 attend 10:14 attention 27:21 attorney 5:11, 55:22 autofocus 22:16, 41:2, 47:21, 49:16, 49:19, 50:8 autofocused 42:12 available 49:11 averaged 42:9, 42:22 away 33:4, 46:18	based 5:8, 31:8, 32:3, 37:3, 42:6, 46:10 basis 21:8, 28:8 beautiful 7:9 because 12:4, 29:15, 31:10, 31:22, 32:15, 33:1, 38:8, 40:12, 47:12, 48:17, 48:21, 49:6, 52:1, 52:15, 52:18 been 9:9, 11:4, 12:3, 12:7, 15:12, 37:1, 37:6, 37:7, 47:22, 48:7, 48:15, 48:20, 51:19 before 1:3, 2:10, 9:10, 11:5, 11:8, 13:2, 22:17, 22:19, 41:5, 44:16, 45:1, 55:7, 55:9 beginning 5:10, 23:2 behalf 3:2, 3:9 being 5:16, 8:7, 26:17, 28:8, 34:4 believe 8:11, 9:22, 13:3, 13:15, 15:20, 20:7, 25:4, 26:16, 28:10, 28:12, 30:12, 32:1, 32:4, 36:8,	45:22, 53:11 below 39:12, 39:22, 40:2, 40:6, 40:9, 40:13 besides 10:13, 36:5, 52:7 between 41:4, 42:16, 44:15, 44:22, 45:6, 45:17 bifano 3:3, 4:7, 5:12, 5:20, 5:22, 11:19, 11:22, 12:4, 12:9, 12:12, 14:8, 17:5, 37:7, 37:10, 37:14, 37:18, 51:7, 51:12, 53:1, 53:6, 53:12, 53:13 bit 7:16, 23:5, 24:12, 44:3 blood 55:21 board 1:3 boston 3:6 both 9:11, 10:21, 11:2, 13:15, 46:6, 50:6, 50:12 box 14:18 break 37:8, 37:17, 51:8, 51:11, 53:7 breaks 6:7 bright 31:11, 31:14,	31:17, 32:15, 39:7 broadly 38:8, 46:22 brown 3:11, 10:4, 11:8 bunch 7:12
B		C	
back 27:19, 33:7, 33:18, 34:10, 37:11, 37:19, 43:5, 43:11, 53:4 ballpark 8:13, 8:15 barbara 6:15, 7:2 barking 43:3 barrier 46:1, 48:9			calculate 33:10 calculated 44:19 calculating 41:8 calculation 31:18, 39:9, 46:4 calculations 31:12 california 2:14, 6:16, 7:2 call 26:1 called 28:12 calls 25:22 camera 41:2, 49:16, 49:19 can't 16:5, 49:5, 49:8 cannot 11:10, 20:17, 21:6, 52:2 case 8:11 caveat 12:6 ccr 1:22, 56:10 cell 7:13 certain 27:10, 32:12,

33:10, 38:10, 42:9 certainly 51:4 certificate 4:9, 55:1 certified 2:11, 55:3 certify 55:5, 55:11, 55:14, 55:17, 55:19 change 15:19, 16:2, 29:19, 38:9, 38:21, 40:12, 40:16, 42:6 changed 19:3, 20:5, 30:14, 38:7 changes 15:15, 15:21, 16:5, 43:7, 43:16, 43:21 chat 11:20, 12:14, 14:9, 17:1, 17:7, 18:17 check 14:6 checks 25:6 chose 48:17 claim 11:18, 12:22, 16:1, 18:8, 18:9, 18:12, 19:4, 19:5, 19:10, 20:1, 20:15, 20:19, 20:22, 21:7, 21:8, 21:10, 21:12, 21:21, 22:2, 22:3, 22:5, 30:5, 35:6, 35:18, 38:5, 43:12	claim's 31:19 claims 18:3, 19:19 clarify 6:4, 25:8 clicked 17:2 closed 8:3 closely 51:4 coffee 7:15 column 23:6, 24:9, 24:10, 24:11, 24:15, 24:16, 27:1, 36:18, 36:22, 37:1, 38:14, 38:18 combination 44:3, 52:13 combine 49:5, 49:8, 50:11 combining 50:18 come 37:10, 37:11, 53:19 commencement 55:8 commencing 55:16 commission 56:7 common 46:11 compare 15:7 compares 38:1, 41:15, 41:21 comparing 41:9 comparison 15:4, 15:13,	16:8, 16:11, 39:20 comparisons 46:15, 46:19, 46:20 compensated 8:7 complementary 47:21, 48:15 comprises 33:12 compute 45:17 computer 7:22 computes 45:5 computing 41:3, 42:5, 44:14, 44:22, 46:10 concluded 54:4 conducted 1:15, 2:1 conjunction 22:22, 23:3 consent 5:12, 5:13 consider 50:17 consideration 34:21 construction 11:18, 12:22, 14:18, 15:1, 15:3, 15:12, 16:1, 16:4, 16:6, 16:10, 16:13, 16:15, 16:20, 20:15, 20:19, 21:8, 33:19, 35:19, 43:6, 43:12, 43:19, 43:22 constructions 13:11, 13:21, 14:13	consultant 7:3 contemplated 19:18 content 30:18 context 23:18, 24:6, 46:5, 46:7, 47:10 contributed 10:21, 11:2 control 22:16 coordinate 24:8 coordinates 24:3 correct 8:8, 9:6, 10:17, 14:1, 14:2, 14:3, 21:19, 25:3, 25:4, 30:19, 31:3, 41:6, 44:11, 45:2, 45:9, 45:10, 45:13, 45:18, 50:8 could 9:1, 9:9, 11:14, 14:5, 15:18, 17:9, 32:19, 39:8, 40:15, 43:9, 45:17, 45:21, 47:22, 48:7, 48:15, 48:20, 49:7, 51:13, 54:2 couldn't 47:6 counsel 5:2, 5:6, 10:3, 10:20, 53:10, 55:12 count 38:11, 40:4
---	---	--	--

Transcript of Matthew Turk, Ph.D.
Conducted on July 15, 2026

60

counting 38:9, 39:17 counts 40:17, 44:8 court 6:5, 9:12 create 32:7, 32:10, 32:20, 35:10, 36:6, 36:14 created 32:17, 37:5 creates 32:1, 32:6 creating 31:19, 33:5, 33:16, 34:1, 34:18, 35:3, 35:15, 35:20, 35:22, 36:1, 36:4, 36:9, 36:11 creation 13:8, 13:12, 13:21, 19:9, 30:15, 33:19, 35:6, 37:2, 52:20 curious 53:20 current 6:22, 24:13, 24:14, 24:19, 24:20 currently 6:14 D daniel 3:17, 11:19, 14:8, 17:5 data 24:14, 24:20, 25:2, 25:13, 25:19, 26:6, 33:9, 43:7, 43:15 date 8:13	day 56:5 days 53:22 dc 3:13 deal 10:3 december 9:9 decide 33:8, 40:3 decision 31:7, 40:3 decisions 32:3 declaration 10:16, 10:19, 10:20, 13:10, 13:14, 13:17, 14:5, 14:6, 14:9, 14:13, 15:8, 17:1, 17:11, 18:15, 18:20, 19:15, 20:10, 21:9, 22:22, 23:3, 29:3, 47:15, 47:16, 51:13 declares 16:5 defined 19:9 defines 26:17, 33:3 definitely 8:18 definitions 13:16, 14:4 delta 41:9 depend 46:8 depending 23:18 deposes 5:16 deposition 1:15, 2:1,	5:22, 6:10, 10:8, 55:6, 55:8, 55:9, 55:13, 55:14, 55:18 depth 11:1 describe 17:22, 26:11, 26:13, 26:14, 48:18 described 15:6, 15:10, 19:10, 20:22, 21:11, 29:14, 33:13, 33:15, 36:1, 36:2, 40:16 describes 20:2, 20:5, 26:15, 27:16, 33:3, 41:8, 44:18 describing 20:7, 24:5, 34:3, 38:19 desk 7:12, 7:17 detail 27:14, 46:21 details 27:19 detect 39:11, 40:16, 43:7, 43:16 detected 34:8, 34:12, 37:1, 37:3, 37:6, 39:14, 39:16 detecting 15:15, 19:2, 38:6, 38:8, 38:21, 40:12, 43:21 detection 13:8, 13:12, 13:22, 14:16,	14:19, 14:22, 15:4, 19:15, 19:18, 20:2, 20:6, 20:21, 21:10, 22:4, 22:6, 30:13, 43:6, 43:15 detects 20:3, 30:14 determination 28:14 determine 9:2, 28:11, 34:11, 38:11, 42:10, 42:11 determines 40:1, 40:6 determining 28:15 determining-a-value 36:21 difference 22:8, 30:9, 30:11, 42:16, 45:6, 45:17 differences 30:16 different 17:15, 17:20, 25:22, 29:4, 29:13, 31:5, 35:17, 39:16, 41:16, 41:22, 50:18, 50:21 differential 14:17, 14:22, 21:10, 41:4, 41:9, 42:5, 44:15, 44:19, 44:22, 45:4, 45:15, 46:13, 46:14, 46:18 differently 25:18 digital 49:16, 49:19 diplomat 2:17
--	--	--	--

Transcript of Matthew Turk, Ph.D.
Conducted on July 15, 2026

61

direct 27:21 directed 41:1, 49:16, 49:19 direction 16:11, 23:13, 23:22, 24:8 directional 14:21 directional-differential 19:17, 20:6, 20:21, 22:4, 22:6 disagree 13:20 discloses 20:8, 41:3, 44:14, 44:21 discussed 37:22, 44:5, 55:19 discusses 23:11 discussing 10:22, 42:17 distinct 29:7 district 9:12 disturbed 41:17, 42:1 divided 32:14 dla 3:4 do-dads 7:13 document 11:3, 12:19, 13:2, 13:5, 13:13 documents 7:17, 7:20, 8:1, 11:1, 29:4 dog 43:2	doing 14:11, 22:8, 23:11, 23:17, 24:7, 34:19, 36:5, 41:2, 46:1 done 15:16, 15:18, 28:8, 32:21, 35:7, 36:10, 39:1, 39:2 double-check 13:14 downloading 12:18 dr 5:21, 12:17, 37:19, 51:13 draft 10:19, 10:20, 53:17 duly 5:16, 55:7	51:22 elements 52:2 else 8:3, 10:13, 19:6, 36:7, 39:8, 52:6 embodiment 41:14, 41:20 embodiments 31:5 emeritus 7:1 employed 55:21 equating 36:9 equivalent 33:5 esquire 3:3, 3:10 est 1:18, 54:5, 55:16 estimate 8:15 estimated 19:11 estimation 42:11 evaluated 34:8, 34:12, 52:9 evaluates 24:13, 37:22 evaluating 25:2 evaluation 24:19, 26:7, 31:3, 41:18, 42:2 even 48:19 eventual 39:10 every 6:9, 26:11 everything 8:3	exact 18:12 exactly 9:8, 42:13, 51:1 examination 4:7, 5:19 example 18:5, 18:7, 19:9, 21:17, 24:4, 31:11, 36:16, 38:22, 39:2, 41:7, 41:22 examples 36:13, 36:15, 36:19 exceed 26:20 exceeding 26:19, 27:5, 27:10 exceeds 24:14, 24:20, 25:2, 25:6, 26:6 exclude 31:4, 31:10, 33:8 excluded 26:7 excludes 31:2, 31:16, 41:17, 42:1 excluding 26:11, 27:4, 42:6 exclusion 26:18, 26:22 excuse 16:17, 22:18, 52:11 exhibit 11:17, 12:8, 14:9, 17:6, 18:13, 22:10, 22:14, 28:21, 33:18, 40:21, 43:12
--	--	---	---

exhibits 4:11 expedited 53:22 expires 56:7 explain 36:17, 38:4, 39:4 explicit 32:10 exposure 31:12 exposure-control 47:19 expresses 50:14 extracted 52:10, 52:16 extraction 19:11, 29:20, 34:9, 34:13 F fact 5:9, 49:11 fair 52:3 far 9:14 fashion 24:7 feature 13:8, 13:12, 13:22, 14:16, 14:19, 15:3, 19:12, 19:14, 20:2, 29:19, 30:12, 39:15, 43:6, 43:14, 52:11, 52:17 features 19:2, 19:22, 20:3, 30:14, 34:8, 34:12, 36:22, 37:3, 38:6, 39:11, 43:8, 43:16	few 10:10 figure 27:21, 28:4, 39:3 figures 24:5, 24:6, 36:15 filing 48:6 filters 39:13 final 53:19 financially 56:1 find 38:17 finding 47:12 fine 37:9, 54:1 first 5:16, 14:16, 17:13, 32:15 floor 3:5 flowchart 28:5 focal 42:10, 46:15, 46:19 focus 26:7 focused 41:17, 42:2 focusing 18:8, 21:21, 47:13 follows 5:18 forever 14:10 form 16:3, 21:13, 24:21, 28:9, 30:8, 31:21, 34:22, 40:14, 49:1 formally 5:3 forming 29:20 forth 55:7 found 32:15 four 32:14, 33:7 front 7:11, 7:13 fruit 7:16 full 6:12 function 27:4, 33:22, 36:3 functions 46:10 fundamentally 17:15, 17:20 further 53:2, 53:8, 55:11, 55:14, 55:17, 55:19 G general 22:1, 26:2, 27:16, 29:12, 31:1, 31:8, 38:19, 46:5, 46:7 generally 25:21, 30:2, 41:13, 47:20, 48:5, 50:9 georgia 2:13 give 18:4, 18:7, 30:10, 36:14, 51:6, 53:3 given 55:10	giving 21:16 gloom 7:4 go 6:1, 12:16, 14:5, 37:14, 37:19 goal 46:9, 46:10 goals 30:3 going 6:10, 14:10, 19:12, 19:14, 22:11, 33:18, 37:7, 43:11, 44:2, 53:19 good 5:21, 8:14, 8:20, 37:8, 39:2 great 5:21, 7:4, 7:9, 8:6, 17:9, 26:4, 52:22, 53:13, 54:3 greater 26:12 greatly 41:17, 42:1 grid 27:17, 28:11, 40:9 grid-based 27:17 grids 26:16 grouping 30:21, 31:3 grouping-and-lum- inance-averaging 29:6, 29:14 groups 32:12 guess 30:9, 44:18, 46:8 H hand 56:5
---	---	---

Transcript of Matthew Turk, Ph.D.
Conducted on July 15, 2026

63

happens 34:18 hear 43:2 help 47:14 here 7:12, 20:20, 21:2, 21:20, 23:18 hereby 55:5 hereinbefore 55:6 hereunto 56:4 hesitate 6:4, 6:8 high 30:21, 50:7 high-luminance 30:6, 30:7, 30:18, 49:22, 50:4 highest 31:6, 31:7 hold 21:4 holding 16:16, 16:18, 16:20, 19:18 home 6:18 honestly 53:17 hop 53:4 hope 43:2 hopefully 6:1 horizontal 16:11 horizontally 23:19 hour 6:9, 8:11, 37:8, 42:18	hourly 8:10 hours 8:12, 8:17 how's 7:5 I identifies 30:6, 30:18, 30:20 identifying 30:7 illinois 2:13 image 23:20, 24:2, 26:18, 27:5, 27:7, 27:8, 27:9, 27:11, 27:13, 28:12, 28:16, 28:18, 28:20, 31:13, 32:11, 32:13, 33:10, 39:5, 39:13, 43:8, 43:16 images 26:15, 50:1, 50:4 imagine 40:15 implement 48:10 imply 28:7 import 20:13, 20:18, 21:6 improper 20:13 inc 1:6 include 22:5 includes 10:12 including 10:11, 15:16	incorporate 49:13 incorporated 47:22, 48:15, 49:7 individual 27:6, 27:11, 28:19, 42:10, 42:17, 43:1 informs 22:7 initial 32:2, 32:4, 45:12 initially 11:3 input 20:4, 38:7 inspection 55:17 instead 5:4 inter 1:11 interested 56:1 interfering 50:8 invention 48:7, 48:11 inventor 48:17 involved 9:17, 9:19, 9:21, 36:20, 39:9 ipr 1:11, 9:4, 9:12, 9:13, 9:14, 9:17 issue 30:4 iwasaki 28:22, 29:12, 30:4, 30:12, 30:18, 31:2, 31:6, 31:16, 32:1, 47:20,	48:6, 49:11, 49:13 iwasaki's 29:5, 48:7, 48:10 J job 1:20 joint 11:18, 12:22 july 1:17, 7:6, 55:15, 56:6 june 7:4 K karisa 1:22, 2:10, 55:3, 56:10 keeps 6:10 key 11:2 know 6:8, 10:22, 12:2, 12:17, 17:3, 18:14, 22:12, 23:9, 27:20, 28:2, 28:22, 36:7, 51:1, 51:17 known 45:15, 48:7 L label 39:6 lane 6:15 language 18:12, 21:21, 22:5, 35:18, 35:19, 36:8, 38:5 larissa 3:3, 5:22
--	---	---	--

Transcript of Matthew Turk, Ph.D.
Conducted on July 15, 2026

64

last 10:11, 10:12, 20:12, 21:3, 38:22, 42:18 lawful 5:16 least 23:22, 30:16, 42:21 left 35:14, 39:6 left-hand 36:18 lens 22:16, 47:13 less 8:19 let's 6:2, 6:4, 11:17, 22:10, 25:19, 28:21, 29:2, 31:11, 37:11, 37:14, 40:19, 46:6, 47:15 level 16:16, 38:1 lieu 5:3 life 6:6 light 49:22, 50:4, 50:7 limit 16:2, 16:14 limitation 19:14, 20:1, 52:19 limitations 20:14, 20:18, 21:7, 51:20, 52:8 line 23:6, 23:18, 23:19, 27:3, 38:18, 51:6 lines 24:12	list 36:7, 48:22 litigation 9:13 little 7:16, 23:5, 43:4, 44:2 live 7:9 llp 3:4 load 12:14 loading 17:2 location 47:13 logic 31:5 long 3:17, 6:10 look 9:1, 18:11, 27:14, 28:21, 29:2, 31:7, 41:11, 42:19, 46:21, 47:15, 47:16, 51:14 looked 28:17 looking 14:16, 24:11, 26:8, 26:9, 31:10, 43:5, 51:5 looks 39:11 luminance 25:6, 25:9, 25:11, 25:14, 25:20, 26:3, 26:6, 26:19, 27:5, 27:10, 28:11, 28:16, 28:18, 28:19, 30:21, 44:11, 45:9, 45:13, 45:18, 45:19,	50:7 M magazines 7:18 mail 7:18 main 10:9 make 6:6, 28:14, 31:7, 47:1, 47:5, 47:9 makes 32:2 making 29:3 manner 24:9 many 8:12, 10:1, 10:6 marked 4:12, 12:3, 12:8 marriage 55:21 massachusetts 3:6 mathematical 43:20, 44:1, 45:5 matter 7:20, 8:2, 8:7, 8:13, 10:4, 11:5, 11:8, 56:2 matters 11:5 matthew 1:16, 2:1, 3:10, 4:6, 5:10, 5:15, 6:13, 10:3, 55:5, 55:15 maxell 1:9, 9:4, 9:7, 9:11, 9:15, 9:20, 11:4	maybe 10:11, 31:4, 35:13 mayer 3:11, 10:4, 11:7 mean 17:19, 23:15, 29:11, 29:12, 29:22, 30:2, 32:7, 32:9, 38:20, 48:4, 48:17, 48:19, 49:3 means 23:17, 49:2 meant 29:21 medications 11:13 meet 31:18, 35:20, 38:5, 38:21 meeting 10:9 meetings 10:1, 10:6, 10:14 mention 16:20, 29:17, 43:22 mentioned 6:20, 29:17, 33:2 mentioning 18:1 mentions 15:21, 47:2 merely 40:17 merit 2:16 met 52:7 method 41:2 metrics 33:10
---	--	---	---

mexico 2:13 middle 36:22 might 26:1, 27:18, 36:7, 42:8 mind 42:15 minute 51:6, 51:7 minutes 53:3 missouri 2:12 moment 11:21, 12:14, 12:15, 14:3, 27:20 monday 10:9 more 8:16, 8:18, 27:13, 27:14, 27:18, 34:2, 36:5 morning 5:21 move 22:11, 40:19 moved 7:6 moving 24:2, 25:5 multiple 26:1, 27:18, 42:21	necessarily 36:12, 42:9, 52:2 need 6:7, 14:13, 36:5, 50:14 needed 36:8 new 2:13, 29:20, 32:6, 32:17, 32:20, 33:3, 33:4, 33:6, 33:16, 33:20, 33:21, 34:18, 35:10, 35:20 next 26:4, 40:10 nice 7:8 none 4:12 notary 2:17, 55:1, 55:4, 56:5 nothing 7:19, 13:18 notice 2:10 noticing 5:10 number 4:3, 38:10, 39:18 nw 3:12	occurred 55:15 office 1:1, 6:18, 7:10 oh 7:7, 18:18, 21:3, 43:18 oklahoma 2:12 one 10:9, 11:21, 12:15, 18:5, 18:7, 18:22, 23:15, 24:3, 30:9, 38:3, 38:19, 40:12, 40:13, 44:6, 48:18, 50:15, 50:17 one's 46:9 only 33:9 open 7:19, 8:1 operates 18:2 operation 45:5 opined 15:8 opinion 17:14 opinions 9:4, 11:2 opposed 42:22 order 44:7, 44:9 ordered 53:21 orders 53:11, 53:12 ordinary 23:16, 45:16, 50:10 other 6:5, 9:19,	11:5, 29:16, 34:6, 49:7, 50:15 otherwise 56:2 out 51:6, 53:19 outcome 56:2 output 40:3 over 6:5, 7:4, 48:21, 54:2 overview 21:14 owner 1:10, 3:9, 5:14, 55:12 owner's 53:17
N		P	
name 5:21, 6:12, 6:13 national 2:14, 2:15, 2:16 nd 53:22, 56:5 nearby 15:7	object 5:7 objection 16:3, 21:13, 24:21, 28:9, 30:8, 31:21, 34:22, 40:14, 47:8, 49:1 obvious 48:20, 48:21	only 46:9 only 33:9 open 7:19, 8:1 operates 18:2 operation 45:5 opined 15:8 opinion 17:14 opinions 9:4, 11:2 opposed 42:22 order 44:7, 44:9 ordered 53:21 orders 53:11, 53:12 ordinary 23:16, 45:16, 50:10 other 6:5, 9:19,	pad 7:15 page 4:2, 13:4, 17:10, 18:21, 20:9, 47:17, 51:15 pages 1:21 paper 7:15 paragraph 17:10, 17:13, 18:1, 18:19, 18:21, 19:16, 20:10, 21:9, 21:14, 21:16, 29:5, 30:1, 41:8, 47:16 paragraphs 41:11, 51:14 part 12:5, 12:10, 27:7, 27:8 partes 1:11

partial 26:15, 26:18, 27:5, 27:9, 27:11, 27:13, 28:12, 28:15, 28:18, 28:20 particular 14:12, 16:10, 21:16, 25:9, 26:20, 31:14, 39:15, 43:20, 44:1, 44:4, 46:9 particularly 21:21 parties 15:13, 55:20, 55:22 party 55:11 pass 33:14 passage 27:9 passed 33:16, 37:11 past 9:9 patent 1:1, 1:3, 1:10, 1:12, 3:9, 5:14, 9:18, 9:22, 15:7, 15:11, 15:20, 17:16, 17:21, 18:3, 18:9, 18:12, 19:1, 19:19, 20:1, 20:7, 20:14, 21:1, 21:12, 21:18, 21:22, 22:3, 22:8, 22:15, 25:22, 27:12, 27:15, 27:22, 29:8, 29:13, 30:1, 30:3, 30:5, 36:13, 39:3, 53:16, 55:12	patents 9:20, 10:22 peak 41:5, 41:15, 41:21, 44:16, 45:1 penalties 5:6 per-pixel 19:17, 29:19 perfect 8:6, 53:13 perform 18:10, 19:17 perhaps 10:10 perjury 5:6 person 45:16 petitioners 1:7, 3:2 ph 1:16 phone 7:13 photometric 41:4, 42:8, 42:16, 42:19, 42:21, 44:15, 44:22 phrase 14:21, 23:14, 23:15, 35:22, 52:12 physically 6:17, 6:18 picture 20:4, 38:7 pipeline 29:7, 30:1 piper 3:4 pix 52:10 pixel 20:4, 24:13, 24:14, 24:19,	24:20, 25:1, 25:20, 26:11, 26:20, 27:1, 27:7, 27:8, 27:13, 28:5, 30:20, 38:7, 39:15, 39:21, 40:1, 40:2, 40:4, 40:6, 40:8, 40:10, 42:17, 42:22, 43:1, 43:7, 43:15, 44:11, 45:8, 45:12, 45:13, 46:10, 46:11, 46:14, 46:20 pixel's 39:21 pixel-by-pixel 28:8 pixels 15:5, 15:7, 15:14, 15:16, 16:9, 19:3, 26:5, 26:20, 27:6, 27:11, 27:18, 28:13, 28:15, 28:19, 30:7, 30:21, 31:11, 31:14, 31:17, 31:20, 32:2, 32:8, 32:12, 32:16, 34:1, 34:4, 34:7, 34:11, 34:20, 35:4, 35:7, 35:9, 35:10, 35:13, 35:21, 36:2, 36:4, 36:6, 36:9, 36:10, 36:19, 36:20, 37:6, 38:1, 38:10, 39:18, 40:18, 42:10, 44:6, 44:8, 52:10, 52:16	place 7:9 please 5:2, 5:11, 6:3, 6:8, 6:11, 17:9, 20:9, 23:6, 24:17, 41:19, 43:13, 44:19, 46:16, 51:14, 53:11 plots 39:12 pointing 49:10 populated 12:15 portion 28:14 position 6:22, 16:19, 19:2, 20:3, 25:1, 38:6, 38:9, 38:21, 45:8 positional 16:16, 16:18, 19:18 positions 24:3, 29:19, 30:14, 39:14, 39:15, 41:5, 41:16, 41:21, 44:16, 45:1 possible 42:20 potential 26:17 predetermined 52:10, 52:17 prehearing 13:1 prepare 10:7, 23:2 prepared 10:16, 13:10 preparing 22:22 present 3:16
---	---	---	---

Transcript of Matthew Turk, Ph.D.
Conducted on July 15, 2026

67

pressure 53:14 previous 25:11 prior 23:2, 52:1, 52:7 probably 6:9, 8:20, 14:10, 18:16, 19:8, 38:16 problem 48:18, 49:22, 50:3, 50:7, 50:12, 50:19, 50:22, 51:2 problematic 36:19, 39:7 problems 50:13, 51:4 procedure 30:13 proceeding 5:8, 9:12, 9:13, 9:14, 9:17, 9:21, 10:17 proceedings 54:4 process 30:2, 36:21, 48:11 processes 38:19 processing 33:15, 33:17 processor 33:9, 34:21 product 48:11 professional 2:15 professor 7:1 proposed 33:2 propounded 5:17	provide 9:4, 11:15, 14:4 provided 13:16 providing 21:14 public 2:17, 55:1, 55:4 published 49:12 pull 18:17, 22:10 purpose 46:9 pursuant 2:10 put 11:19, 14:8 Q question 6:2, 18:22, 21:4, 21:5, 24:17, 25:8, 25:11, 25:17, 26:10, 35:1, 41:19, 44:20 questions 5:17, 14:12, 53:2, 53:5, 53:9 R ranch 6:15 range 46:15, 46:19 raster 23:12, 23:13, 44:7, 44:8 rate 8:10 rather 46:15 rdr 1:22, 56:10 read 20:20, 21:12,	22:19 reading 30:5, 55:18 really 8:20 reason 11:10, 13:20, 39:7 recall 25:21, 27:15, 44:17, 47:2 recited 19:22 recognize 12:19 record 6:6, 6:12, 12:5, 12:11, 37:15, 55:10 records 9:1 reference 21:15, 44:14, 50:20 referenced 26:22 references 44:3, 49:6, 50:11 referring 25:10, 26:16, 28:17, 38:13, 38:14, 43:10 refers 24:12, 24:18 regarding 9:18 region 13:7, 13:11, 13:21, 27:1, 27:2, 29:20, 30:15, 30:20, 31:17, 31:19, 32:8, 32:15, 32:16, 32:17, 32:20, 33:3, 33:4, 33:8, 33:11, 33:16,	33:19, 33:20, 34:1, 34:9, 34:13, 34:19, 34:20, 35:3, 35:5, 35:7, 35:9, 35:11, 35:13, 35:15, 35:20, 35:21, 35:22, 36:1, 36:4, 36:6, 36:9, 36:11, 36:14, 39:6, 52:9, 52:15, 52:20 regions 19:9, 19:11, 30:6, 31:14, 32:1, 32:3, 32:6, 32:14, 32:17, 32:20, 33:8, 33:14, 37:2, 37:4, 37:5, 42:6 registered 2:15, 2:16 related 7:20, 8:1, 11:1, 51:4, 55:20 relying 35:19 remember 9:8, 13:15, 29:9 remote 11:21, 12:13 remotely 1:15 remove 35:9 removed 32:11, 32:14, 34:5, 35:10, 35:12, 35:13 removing 31:20, 32:1, 32:8, 34:1, 34:6, 34:7,
---	--	---	--

Transcript of Matthew Turk, Ph.D.
Conducted on July 15, 2026

68

34:20, 35:3, 35:5, 35:7, 35:21, 36:2, 36:4, 36:5, 36:9, 36:10, 37:5 repeat 24:17, 41:19, 44:19, 46:16 rephrase 21:5 reply 5:17 reported 1:22 reporter 2:11, 2:15, 2:16, 2:17, 4:9, 5:2, 5:4, 6:5, 12:1, 37:16, 51:10, 53:10, 53:14, 53:21, 55:1, 55:3 representation 32:10 represented 55:12 require 15:4, 16:15, 18:3, 21:9, 43:19 required 15:9, 19:4, 42:20 requirement 31:19 requirements 34:4 requires 15:13, 15:15, 22:3, 35:6, 43:7, 43:15 requiring 16:8 residing 6:14 response 21:3	rest 17:22 result 39:14, 42:7 retained 9:3, 9:7, 9:15, 11:4 review 1:11 reviewed 13:2, 22:17, 22:19 right 6:17, 7:8, 7:10, 8:3, 9:5, 10:18, 16:22, 23:1, 23:4, 25:7, 26:7, 27:15, 28:21, 29:20, 30:22, 31:13, 34:1, 35:8, 37:14, 38:2, 39:13, 40:19, 41:5, 41:10, 41:13, 41:18, 42:2, 42:3, 42:7, 43:8, 44:7, 44:16, 45:6, 45:7, 47:13, 50:22 right-hand 14:18, 37:1 rmr 1:22, 56:10 rough 53:17, 54:2 row 23:18, 24:9 rpr 1:22, 56:10 S said 14:3, 17:19, 21:4, 34:15, 38:21, 55:18 same 24:3, 24:15,	24:16, 36:11, 49:6, 50:22, 51:1 samsung 1:5, 1:6, 9:20 santa 6:15, 7:2 satisfied 52:12 satisfy 52:1, 52:3, 52:19 say 8:16, 17:14, 18:9, 19:16, 21:20, 23:12, 24:1, 26:13, 27:12, 29:5, 31:11, 31:17, 32:9, 32:13, 33:20, 34:2, 34:18, 35:5, 35:12, 35:19, 40:8, 42:13, 46:3, 47:19, 52:11 saying 26:22, 29:9, 34:3, 47:5, 48:9, 48:12, 48:14, 49:5 says 5:17, 20:12, 27:15, 33:22, 34:2, 36:3, 43:6, 43:14 scan 23:12, 44:7, 44:8 scanning 23:13 screen 7:14 seal 56:5 second 31:7, 44:13 section 21:15, 26:11,	34:11, 39:5 see 12:15, 13:7, 14:20, 16:4, 16:13, 17:17, 19:20, 20:12, 23:11, 23:14, 24:12, 24:18, 24:22, 28:4, 28:6, 42:20, 43:17, 43:18, 47:18, 48:2, 50:13 segmentation 32:2, 32:4 selected 33:11, 33:13 send 33:8, 54:2 sense 8:21, 36:19, 47:1, 47:5, 47:9 sentence 17:14, 20:12, 29:17, 49:10 separate 14:4 set 55:6, 56:4 setting 42:12 seven 53:22 several 19:8 shorthand 2:11, 55:1 should 12:15, 18:17, 21:11, 23:12, 45:14 shouldn't 39:9 show 36:18, 39:13 showing 28:10 shown 39:3
--	--	--	---

Transcript of Matthew Turk, Ph.D.
Conducted on July 15, 2026

69

shows 36:22, 37:2 shui 40:20, 41:1, 41:3, 41:8, 41:15, 41:21, 42:4, 44:4, 44:13, 44:21, 45:22, 46:5, 46:7, 46:12, 46:17, 46:21, 47:2, 47:4, 47:10, 47:12, 49:18, 50:3, 50:6 side 53:17 side-by-side 45:19 signal 20:4, 38:7 signature-mig2k 56:8 signing 55:18 similar 50:12, 50:13, 50:18 sitting 7:13 skill 23:16, 45:16, 50:11 smoothly 6:1 solve 50:12 solving 48:18, 50:21 some 14:12, 21:17, 30:20, 31:4, 32:15, 36:19, 39:7 someone 45:21, 46:3, 50:10 something 6:3, 23:17,	24:7, 33:4, 33:5, 36:10, 38:12, 38:17, 39:8, 40:15, 46:2, 50:14 sometimes 31:6 sorry 18:21, 19:12, 24:15, 29:3, 43:2, 43:9, 43:11, 51:5 sort 29:3 sounds 49:4 sources 49:22, 50:4, 50:7 spatial 46:14, 46:19, 47:6, 47:10 spec 22:7 specific 38:17 specifically 9:16, 27:16 specification 15:11, 20:5, 20:14, 20:18, 20:22, 21:7, 21:11, 21:19 specify 16:7, 16:10 spend 8:12 spot 40:8 spotlight 39:8 stack 7:18 stand 13:22 stanford 3:10, 5:13, 10:3, 10:7,	10:13, 12:6, 12:10, 16:3, 21:13, 24:21, 28:9, 30:8, 31:21, 34:22, 40:14, 47:8, 49:1, 53:3, 53:8, 53:15, 53:16, 54:1 start 11:17, 28:5, 46:6 starting 27:3, 38:18, 40:5 starts 28:5 state 6:11, 55:4 statement 11:18, 13:1 states 1:1, 2:12 stating 49:11 step 26:4 steps 30:2 still 12:18, 35:12, 39:20 stipulate 5:3 stop 6:9 street 3:5, 3:12 strike 10:2, 13:18, 16:7, 18:5, 19:13 structure 27:17, 43:17 style 4:3 summary 52:4	suppose 45:21 sure 8:14, 9:10, 10:11, 12:9, 13:15, 14:6, 14:15, 15:7, 18:13, 24:18, 41:20, 43:14, 44:21, 46:17, 50:17, 51:9 swearing 5:3 sworn 5:16, 55:7 system 49:16, 49:19 systematically 24:2 T take 12:14, 14:10, 37:8, 51:7 taken 55:9 takes 30:3, 50:21 taking 5:22, 33:4, 42:4 talk 6:5, 23:4, 40:19, 44:2 talked 10:10, 39:17, 40:20 talking 21:22, 27:9, 51:20 talks 27:3 teach 18:8, 19:7 teaches 23:5, 42:5, 46:12, 46:18 teaching 46:12
---	---	--	--

Transcript of Matthew Turk, Ph.D.
Conducted on July 15, 2026

70

technical 27:19 technician 3:17, 11:21, 12:13 technique 43:20, 44:1, 46:13, 46:14, 46:19, 47:6, 47:10 techniques 45:16, 47:20, 47:22 technologically 29:7 tell 18:4, 43:9, 46:3, 53:4 temporal 15:19, 15:21, 16:5 tennessee 2:13 terms 13:7 testify 11:10, 11:15 testimony 5:5, 11:15, 55:10 texas 2:14 th 3:5 th1 24:14, 24:20, 25:3, 25:7, 26:6, 27:5, 38:2 thank 9:3, 11:22 therefore 49:8 thing 18:5, 18:7, 19:1, 35:17, 36:12 things 7:19, 19:8,	21:17, 26:1, 29:15, 29:16, 31:8, 38:3 think 11:6, 11:12, 12:4, 14:2, 14:4, 21:20, 24:6, 25:8, 26:10, 30:13, 30:15, 32:19, 32:21, 33:21, 35:14, 35:17, 38:5, 41:6, 42:12, 47:1, 49:2, 52:5, 52:15, 52:18 three 33:14, 35:14, 36:18 threshold 25:3, 26:12, 26:19, 26:21, 27:10, 38:1, 38:11, 39:19, 39:22, 40:2, 40:7, 40:9, 40:11, 40:18 through 20:15, 20:19, 21:8, 24:2, 29:4, 51:5 throughout 23:20, 38:16 time 24:3, 37:8, 44:6, 48:5, 49:7, 49:12 times 10:10 today 6:1, 11:11, 11:14, 11:15, 13:22, 54:2 together 42:22 took 32:13 trademark 1:1	transcript 5:7, 12:2, 53:11 trial 1:3 trouble 49:4 true 5:5, 20:17, 21:6, 52:3, 55:9 truthfully 11:11 try 6:4, 38:17 trying 25:15 tsujino 18:1, 18:5, 18:8, 18:10, 19:1, 19:6, 19:16, 21:15, 21:17, 22:9, 22:11, 22:12, 22:15, 23:5, 24:1, 25:1, 25:6, 26:5, 26:17, 37:19, 37:22, 38:13, 38:16, 39:17, 39:20, 40:16, 40:17, 44:4, 44:6, 44:8, 45:8, 48:1, 48:6, 48:8, 48:10, 49:12, 49:15, 49:21, 50:6 tsujino's 17:14, 17:20, 47:21, 48:6 tsujino-iwasaki 52:12 turk 1:16, 2:1, 4:6, 5:10, 5:15, 5:21, 6:13, 12:17, 37:19, 51:13, 55:5,	55:15 turn 13:4, 17:9, 20:9, 23:6 two 13:21, 45:6, 45:17, 45:19, 49:5, 53:3 type 46:4 typically 6:9, 15:16, 32:9, 42:21 U under 5:6 understand 6:3, 15:22, 20:13, 25:15 understanding 49:4 unit 13:8, 13:12, 13:21, 13:22, 14:17, 14:19, 15:4, 19:15, 20:3, 26:17, 30:13, 30:15, 33:19, 43:6, 43:15, 52:20 united 1:1 university 7:2 updated 23:12 updating 24:8 upload 17:6 use 28:13, 42:11, 44:12 uses 15:20, 40:2, 42:8, 44:17 using 31:6, 38:11,
--	--	--	---

Transcript of Matthew Turk, Ph.D.
Conducted on July 15, 2026

71

45:15	want	37:9, 37:13, 51:9, 55:6, 55:10, 56:4	1-2
V	12:1, 23:4, 36:20, 37:10, 37:19, 41:11	word	41:9
value	washington	14:17, 14:20, 33:21, 44:17	10
19:10, 19:11, 24:14, 24:20, 25:2, 25:6, 25:9, 25:10, 25:12, 25:13, 25:14, 25:20, 26:2, 26:3, 26:6, 26:12, 28:11, 28:16, 28:18, 28:19, 34:8, 34:12, 39:10, 41:10, 44:11, 45:9, 45:13, 52:9	2:14, 3:13	wording	8:16, 8:18, 37:11, 39:6
values	water	27:3	100
24:9, 28:15, 41:4, 42:8, 42:11, 42:16, 42:17, 42:19, 42:21, 42:22, 44:12, 44:15, 45:1, 45:6, 45:18, 45:19, 46:11	7:15	words	8:19
variation	way	34:6	1001
48:20	5:8, 15:6, 15:18, 15:22, 22:7, 39:12, 44:18, 56:1	work	17:6, 18:13
verified	we'll	8:7, 37:12	1005
5:9	6:9	worked	17:6, 22:10, 22:14
vertical	we're	11:7	1006
16:12	16:8, 17:5, 22:11, 37:16, 43:11, 44:2	wouldn't	17:7, 40:21
vertically	we've	47:5, 47:9, 48:21, 50:10	1007
23:19	37:7, 44:5, 51:19	written	17:6, 28:21
via	weather	13:13	103
2:1, 3:2, 3:9	7:5	Y	51:14
videoconference	wednesday	yeah	105
2:2	1:17	12:12, 18:16, 24:16, 39:5, 43:18, 49:5, 53:14	51:14
vintage	week	ys	11
6:15	10:11, 10:12	44:19	23:6, 24:5, 24:15, 24:16, 38:15, 38:18
virtually	whatever	Z	12
55:15	26:1	zoom	1:18, 26:9, 27:1, 27:21, 28:4, 38:14, 55:16
W	whereof	2:1, 3:2, 3:9	13
waiting	56:4	0	24:5
17:6	whereupon	01315	134
	37:17, 51:11, 53:7, 54:4	1:11	41:15, 41:21
	whether	02110	138
	15:8, 15:12, 15:13, 21:20, 24:13, 24:19, 25:2, 25:6, 30:19, 39:21, 40:1, 40:3, 53:4	3:6	41:15, 41:21
	whole	05	14
	21:22, 23:20, 42:4, 52:11	1:18, 55:16	24:6
	within	1	15
	55:4	54:5, 55:16	1:17, 51:7, 55:15
	witness	1,1	16
	4:6, 5:4, 5:9,	24:3, 40:8	37:2, 37:4
		1,2	17
		40:10	37:2, 37:4
			18
			37:2, 37:5, 56:7
			19
			37:2, 37:5

Transcript of Matthew Turk, Ph.D.
Conducted on July 15, 2026

72

1999 3:12 1a 19:5, 19:14, 20:1, 20:2, 51:20, 52:2, 52:8 1b 51:20, 52:2, 52:8, 52:19 1f 51:21, 51:22, 52:3, 52:6 2 20 17:10, 18:21 20006 3:13 2015 14:9 2017 11:17, 33:18, 43:12 202 3:14 2025 1:11 2026 1:17, 55:15, 56:6 2028 56:7 22 38:18, 53:22, 56:5 24 20:10, 24:12 26 3:5 263 3:14 29 47:17 3 3000 3:14	31 24:12 33 3:5 36 51:15 4 4's 33:9 406 3:7 41 26:9, 27:3 4658 6:15 5 55 4:9 56 1:21, 54:5, 55:16 58 26:9 59 17:10, 17:13, 18:21, 19:16, 21:9, 21:14 6 6- 56:7 6000 3:7 617 3:7 625 8:11 63 29:5 638178 1:20 64 23:6 645 9:22 67 23:7	8 8,471,950 1:12 8,8 24:4 850 22:15, 27:12, 27:22 86 47:16 9 93110 6:16 950 9:18, 15:6, 15:11, 17:16, 17:21, 18:2, 18:9, 18:11, 19:19, 20:1, 20:7, 20:22, 21:1, 21:11, 21:12, 21:18, 21:19, 22:3, 22:8, 29:8, 29:13, 30:1, 30:3, 30:5, 31:18, 36:13, 39:3	
---	---	---	--