

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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**LAM RESEARCH CORP.,**

Petitioner,

v.

**INPRIA CORP.,**

Patent Owner.

Case No. IPR2024-00033

Patent No. 9,823,564

**PETITIONER'S RESPONSIVE SUPPLEMENTAL BRIEF  
REGARDING THE PRIOR ART STATUS OF STOWERS 2008**

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## LIST OF EXHIBITS

| Exhibit | Description                                                                                                                                                                                                                                                            | Previously Submitted |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 1001    | U.S. Patent No. 9,823,564 (“’564 patent”)                                                                                                                                                                                                                              | X                    |
| 1002    | Expert Declaration of Karey Holland, Ph.D. (“Holland Declaration”)                                                                                                                                                                                                     | X                    |
| 1003    | U.S. Patent Publication No. 2011/0293888 (“’888 publication”)                                                                                                                                                                                                          | X                    |
| 1004    | U.S. Application No. 12/850,867 Prosecution History (“’867 application PH”)                                                                                                                                                                                            | X                    |
| 1005    | U.S. Application No. 61/350,103 (“’103 provisional”)                                                                                                                                                                                                                   | X                    |
| 1006    | Declaration Sylvia Hall-Ellis, Ph.D. Regarding Authenticity and Public Availability (“Hall-Ellis Declaration”)                                                                                                                                                         | X                    |
| 1007    | ’564 Patent Prosecution History (“’564 patent PH”)                                                                                                                                                                                                                     | X                    |
| 1008    | Stowers, Jason K. <i>Direct patterning of solution deposited metal oxides</i> . Oregon State University, 2008 (“Stowers 2008”)                                                                                                                                         | X                    |
| 1009    | U.S. Patent No. 10,782,610 Prosecution History (“’610 patent PH”)                                                                                                                                                                                                      | X                    |
| 1010    | Stowers, Jason, and Douglas A. Keszler. <i>High resolution, high sensitivity inorganic resists</i> . Microelectronic Engineering 86.4-6 (2009): 730-733 (“Stowers 2009”)                                                                                               | X                    |
| 1011    | Complaint for <i>Inpria Corp. v. Lam Research Corp.</i> , 1-22-cv-01359                                                                                                                                                                                                | X                    |
| 1012    | Jouve, A., et al. <i>Overcoming pattern collapse of ultra high resolution dense lines obtained with EUV resists</i> . Advances in Resist Technology and Processing XXII. Vol. 5753. SPIE, 2005 (“Jouve”)                                                               | X                    |
| 1013    | Stowers, Jason, Alan Telecky, and Andrew Grenville. <i>Imageable oxides: new solutions for resist</i> . EUVL Symposium. 2010, available at <a href="https://euvl_symposium.lbl.gov/pdf/2010/pres/RE-08.pdf">https://euvl_symposium.lbl.gov/pdf/2010/pres/RE-08.pdf</a> | X                    |

| Exhibit | Description                                                                                                                                                                                                                       | Previously Submitted |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| 1014    | Telecky, Alan, et al. <i>Photopatternable inorganic hardmask</i> . Journal of Vacuum Science & Technology B 28.6 (2010): C6S19-C6S22 (“Telecky 2010”)                                                                             | X                    |
| 1015    | Summons for <i>Inpria Corp. v. Lam Research Corp.</i> , 1-22-cv-01359                                                                                                                                                             | X                    |
| 1016    | Amador et al. <i>Patterning chemistry of HafSO<sub>x</sub> resist</i> . Advances in Patterning Materials and Processes XXXI. Vol. 9051. SPIE, 2014                                                                                | X                    |
| 1017    | Reserved                                                                                                                                                                                                                          | X                    |
| 1018    | Decker, Shawn R. <i>On the Properties and Characteristics of Solution Processed Hafnium Based Thin-Films from Aqueous Precursors</i> . Oregon State University, 2017                                                              | X                    |
| 1019    | Oleksak et al. <i>Evaluation of Thermal and Radiation Induced Chemistries of Metal Oxo–Hydroxo Clusters for Next-Generation Nanoscale Inorganic Resists</i> . ACS Applied Nano Materials 1.9 (2018): 4548-4556                    | X                    |
| 1020    | Reserved                                                                                                                                                                                                                          | X                    |
| 1021    | U.S. Patent No. 7,773,365                                                                                                                                                                                                         | X                    |
| 1022    | Stowers et al. <i>Directly patterned inorganic hardmask for EUV lithography</i> . Extreme Ultraviolet (EUV) Lithography II. Vol. 7969. SPIE, 2011 (“Stowers 2011”)                                                                | X                    |
| 1023    | Reserved                                                                                                                                                                                                                          | X                    |
| 1024    | Trikeriotis et al. <i>Development of an inorganic photoresist for DUV, EUV, and electron beam imaging</i> . Advances in Resist Materials and Processing Technology XXVII. Vol. 7639. SPIE, 2010 (“Trikeriotis”) (Library Version) | X                    |
| 1025    | Matsuzawa et al. <i>Theoretical estimation of absorption coefficients of various polymers at 13nm</i> . Journal of Photopolymer Science and Technology 12.4 (1999): 571-576.                                                      | X                    |
| 1026    | Puurunen et al. <i>Hafnium oxide films by atomic layer deposition for high-<math>\kappa</math> gate dielectric applications: Analysis of the density of nanometer-thin films</i> . Applied Physics Letters 86.7 (2005).           | X                    |

| Exhibit | Description                                                                                                                                                                                                                          | Previously Submitted |
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| 1027    | Ober and Giannelis. <i>New oxide nanoparticle extreme-UV photoresists achieve high sensitivity</i> . SPIE Newsroom (2014): 2-4.                                                                                                      | X                    |
| 1028    | <i>Curriculum Vitae</i> of Sylvia D. Hall-Ellis, Ph.D.                                                                                                                                                                               | X                    |
| 1029    | <i>Curriculum Vitae</i> of Karey L. Holland, Ph.D.                                                                                                                                                                                   | X                    |
| 1030    | Anderson, Jeremy T., et al. <i>Solution-processed HafSOx and ZircSOx inorganic thin-film dielectrics and nanolaminates</i> . Advanced Functional Materials 17.13 (2007): 2117-2124 (“Anderson”)                                      | X                    |
| 1031    | Trikeriotis et al. <i>Development of an inorganic photoresist for DUV, EUV, and electron beam imaging</i> . Advances in Resist Materials and Processing Technology XXVII. Vol. 7639. SPIE, 2010 (“Trikeriotis”) (Electronic Version) | X                    |
| 1032    | Deposition Transcript of Jason Stowers, Ph.D. (October 11, 2024)                                                                                                                                                                     | X                    |
| 1033    | Deposition Transcript of Sanjay K. Banerjee, Ph.D. (September 27, 2024)                                                                                                                                                              | X                    |
| 1034    | Oleksak RP & Herman GS, <i>Characterization of High-Resolution HafSOx Inorganic Resists</i> . Proc. SPIE 9048, Extreme Ultraviolet (EUV) Lithography V, 90483H (2014).                                                               | X                    |
| 1035    | Trakhtenberg S et al., <i>Non-Catalytic Photo-Induced Immobilization Process In Polymer Films, in Physico-Chemical Phenomena in Thin Films &amp; At Solid Surfaces</i> (Trakhtenberg, L, Lin, S; Ilegbusi, eds. 2007)                | X                    |
| 1036    | Krysak, Marie E., et al., <i>Investigation of Novel Inorganic Resist Material for EUV Lithography</i> . Proc. SPIE 9048, Extreme Ultraviolet (EUV) Lithography V, 904805 (2014) (“Krysak”)                                           | X                    |
| 1037    | Brainard, Robert L, <i>Photoresists for EUV Lithography, in EUV Litogarphy</i> (Bakshi, V. Ed. 2018)                                                                                                                                 | X                    |
| 1038    | International Application Publication No. WO2008/082448 (“Keszler”)                                                                                                                                                                  | X                    |

| Exhibit | Description                                                                                                                                                                                                                                       | Previously Submitted |
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| 1039    | R. Chang & K Goldsby, <i>Chemistry</i> (11th ed. 2013) (excerpts).                                                                                                                                                                                | X                    |
| 1040    | Expert Declaration of Karey Holland, Ph.D.                                                                                                                                                                                                        | X                    |
| 1041    | Declaration of Heather Stewart                                                                                                                                                                                                                    | X                    |
| 1042    | Email from Brad Engelbert, Cataloging & Government Documents Manager of Oregon State University, to Risa L. Murphy, Morgan, Lewis & Bockius (August 13, 2024)                                                                                     | X                    |
| 1043    | Declaration of Patrick Franzen                                                                                                                                                                                                                    | X                    |
| 1044    | Fallica et al., <i>Absorption Coefficient of Metal-Containing Photoresists in the Extreme Ultraviolet</i> , J Micro/Nanolith. MEMS MOEMS 17(2), 023505 (2018)                                                                                     | X                    |
| 1045    | Reserved                                                                                                                                                                                                                                          | X                    |
| 1046    | Kirchauer, Heinrich, <i>Photolithography Simulation</i> , Vienna University of Technology, 1998 (available at <a href="https://www.iue.tuwien.ac.at/phd/kirchauer/diss.html">https://www.iue.tuwien.ac.at/phd/kirchauer/diss.html</a> ) (excerpt) | X                    |
| 1047    | Schnabel, Wolfram, <i>Polymers &amp; Electromagnetic Radiation: Fundamentals &amp; Practical Applications</i> (2014).                                                                                                                             | X                    |
| 1048    | Petitioner's Demonstratives for January 30, 2025 Hearing                                                                                                                                                                                          | X                    |
| 1049    | Version of Stowers 2008 downloaded from ProQuest Database, attested to by Dion Bregman (EX1050 at 35:8-17)                                                                                                                                        | X                    |
| 1050    | Deposition Transcript of Heather Stewart (February 24, 2025)                                                                                                                                                                                      | X                    |
| 1051    | Version of Stowers 2008 downloaded from Oregon State University, attested to by Dion Bregman (EX1050 at 35:8-17)                                                                                                                                  | X                    |
| 1052    | Redline Comparison of EX1008 and EX1051, attested to by Dion Bregman (EX1050 at 37:4-9)                                                                                                                                                           | X                    |
| 1053    | Redline Comparison of EX1008 and EX1049, attested to by Dion Bregman (EX1050 at 38:8-11)                                                                                                                                                          | X                    |

Overwhelming evidence confirms Stowers 2008 is prior art. Petitioner has demonstrated that (i) the Oregon State University (“OSU”) and ProQuest versions of Stowers 2008 are substantively identical, (ii) Stowers 2008 was publicly accessible *from OSU* in October 2008, and (iii) Dr. Stowers’ embargo request applied only to *ProQuest*, not OSU. Patent Owner’s (PO’s) sole rebuttal—that OSU’s publication must have been embargoed simply because ProQuest’s was—is baseless attorney argument devoid of evidence. The Board should reject PO’s unfounded assertions and confirm Stowers 2008 as prior art.

**I. PO MISCHARACTERIZES THE RECORD ON STOWERS 2008**

**A. Petitioner Has Consistently and Repeatedly Demonstrated that Stowers 2008 Was Accessible from OSU in October 2008**

PO spends much of its brief arguing that Petitioner has presented “ever-shifting prior art theories” that were “presented too late and are prejudicial.” Paper 59 at 1, 5. But Petitioner’s arguments have been consistent throughout this proceeding: Stowers 2008 qualifies as prior art because it was publicly accessible from OSU in October 2008. *See* Pet. at 19 (citing EX1006 ¶¶44-50, 67); EX1006, ¶¶44-50 (relying on OSU library records to confirm public availability of Stowers 2008). Indeed, during the prosecution history of the ’564 Patent, PO itself identified Stowers 2008 as prior art. EX1007, 53. As set forth in the Petition and afterwards, Petitioner has repeatedly identified evidence demonstrating that Stowers 2008 was available from OSU by October 21, 2008, including without limitation: MARC

records from the OSU library (EX1006, ¶¶44-50), OSU’s own website as reported by Dr. Stowers and an OSU librarian (EX2012 at 5), an email from OSU’s Cataloging Manager, who stated that “OSU Libraries made this dissertation [Stowers 2008] publicly available on 10-21-2008” (EX1042), and sworn testimony from library records expert Dr. Sylvia Hall-Ellis (EX1006 at ¶50). The Federal Circuit and the Board have frequently relied upon these types of records to confirm the public accessibility of prior art. *See, e.g., In re Hall*, 781 F.2d 897, 899 (Fed. Cir. 1986); *Hulu, LLC v. Sound View Innovations, LLC*, IPR2018-01039, 2021 WL 4876224 (Oct. 5, 2021).

Even when PO first raised its embargo theory, Petitioner consistently argued that “the OSU Library ‘made this dissertation publicly available on **10-21-2008**’” and noted that PO had no documentation supporting any actual embargo of the OSU publication. Paper 27 at 9 (quoting EX1042). The embargo request for ProQuest, once produced, confirmed OSU’s publication was unrestricted, supporting Petitioner’s evidence that the OSU publication was not subject to an embargo. *See* Section B, *supra*.

Moreover, there is no dispute that the various publications of Stowers 2008 are substantively and materially identical. *See, e.g.,* EX1008, EX1049; EX1051; EX1050 at 54:12-15, 30:19-31:10. Redline comparisons confirm that the only differences between EX1008 and the OSU publication (EX1051) were a footer

added for the IPR and a copyright page in the recently downloaded ProQuest publication (EX1049). *See* EX1052 and EX1053. Given the substantive equivalence of the various publications of Stowers 2008, the preponderance of the evidence is consistent with the argument raised in the Petition—that Stowers 2008 was publicly available from OSU in October 2008.

**B. PO’s Embargo Assertion Is Baseless Speculation**

PO’s assertion that an embargo delayed public access of Stowers 2008 *from OSU* is unsupported and misleading. PO relies on three pieces of evidence to support its argument: (i) Dr. Stowers’ self-serving testimony and email (Paper 59 at 5), (ii) an OSU librarian email (*id.* at 1), and (iii) the OSU packet showing an embargo request *only for ProQuest* (*id.* at 3, 5). Critically, the evidence identified by PO fails to demonstrate that there was an embargo of Stowers 2008 *by OSU*. Dr. Stowers’ testimony and email identifies an embargo request, generally—but not its target. *See* EX2008 at ¶¶5-7, p. 6. The OSU library email relied upon by PO confirms that there is no “record of prior embargo dates . . . for anything earlier than 2017” such that OSU has no evidence of any embargo by OSU of Stowers 2008. EX2012 at 1. And the recently acquired OSU packet confirms that Dr. Stower’s embargo request (on a ProQuest publishing agreement form) was directed at ProQuest’s publication, not OSU’s. EX2020 at 2-3; EX2020 at 2-3 (form “PQS07DPA” stating that “Embargoes start from the date we receive your

manuscript at ProQuest/UMI”); *see also* EX1050 at 23:17-25:1 (ProQuest’s witness stating “[t]his is a ProQuest publishing agreement form.”).

Indeed, ProQuest’s witness, Ms. Stewart, repeatedly confirmed that the embargo applied only to ProQuest, not OSU, confirming that “ProQuest is not connected to the OSU repository,” “ProQuest embargoes are specific to ProQuest,” the “embargo applies only to ProQuest’s publication of the Stowers 2008 dissertation,” and that “it wouldn’t apply to OSU.” EX1050 at 43:4-15, 44:20-45:16.

In light of the evidence of record that Dr. Stowers requested an embargo *from ProQuest* but not OSU, PO is left only with speculative attorney argument that: “[t]here is no reason to believe that OSU did not apply the embargo when ProQuest did” and that Dr. Stowers’ request that the ProQuest publication be available for purchase “makes no sense if OSU had already published the same dissertation for free.” Pet. at 5. But the Board must consider the *evidence* of record, and “attorney argument is not evidence” and cannot rebut other admitted evidence. *Icon Health & Fitness, Inc. v. Strava, Inc.*, 849 F.3d 1034, 1043 (Fed. Cir. 2017). Here, the Board “must make the necessary findings and have an adequate evidentiary basis for its findings,” and PO’s attorney argument that OSU applied the ProQuest embargo is not only unsupported by but also inconsistent with the factual record and testimony in this proceeding. *Id.* (quoting *In re NuVasive, Inc.*, 842 F.3d 1376, 1382 (Fed. Cir. 2016)).

## II. PETITIONER’S EXHIBITS ARE ADMISSIBLE AND AUTHENTIC

PO may object to exhibits submitted with Petitioner’s Opening Supplemental Brief (EX1049, EX1051, EX1052, EX1053) as untimely or unauthenticated. Any such arguments are meritless.

First, the Board “has broad discretion to regulate the presentation of evidence” including allowing Petitioner to present evidence that is “legitimately responsive to” arguments raised by PO. *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1080-81 (Fed. Cir. 2015). Here, the Board specifically authorized the Parties to “present documents to Ms. Stewart during the deposition to facilitate questioning and...that such documents may be filed by either party in support of its opening Supplemental Brief.” Paper 57 at 3. Petitioner did just that—it responded to an argument by PO that questioned the similarities of the ProQuest and OSU publications by presenting exhibits to Ms. Stewart about ProQuest’s publication. *See* EX1050 at 35:8-17; 54:12-15, 30:19-31:10; 37:4-38:11.

Second, the burden of authentication is “slight” and can be met by circumstantial evidence. *LG Display Co., Ltd. v. Au Optronics Corp.*, 265 F.R.D. 189, 196 (D. Del. 2010). There can be no legitimate concern whether EX1049, EX1051, EX1052, EX1053 are authentic, given the testimony of Ms. Stewart (EX1050 at 30:19-38:11), and the declaration of Dr. Hall-Ellis (EX1006 at ¶¶44-50).

Dated: March 12, 2025

/s/ Dion M. Bregman

Dion M. Bregman, Reg. No. 45,645

**CERTIFICATE OF SERVICE**

Pursuant to 37 C.F.R. § 42.6(e)(4), it is hereby certified that on March 12, 2025 an electronic copy of this PETITIONER’S RESPONSIVE SUPPLEMENTAL BRIEF REGARDING THE PRIOR ART STATUS OF STOWERS 2008 was served via email to Patent Owner’s counsel of record in this proceeding:

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Dated: March 12, 2025

/s/ Dion M. Bregman

Dion M. Bregman, Reg. No. 45,645