IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

CYTONOME/ST, LLC, Plaintiff/Counterclaim-Defendant, v. NANOCELLECT BIOMEDICAL, INC., Defendant/Counterclaim-Plaintiff,	CASE NO.: 1:19-cv-00301-RGA **DEMAND FOR JURY TRIAL**

DEFENDANT/COUNTERCLAIM-PLAINTIFF
NANOCELLECT BIOMEDICAL, INC.'S INITIAL INVALIDITY CONTENTIONS

Pursuant to Paragraph 3(f)(v) of the Court's Scheduling Order (D.I. 15), Defendant NanoCellect Biomedical, Inc., ("Defendant" or "NanoCellect") hereby provides its Initial Invalidity Contentions for U.S. Patent Nos. 6,877,528 ("the '528 patent"), 8,623,295 ("the '295 patent"), 9,011,797 ("the '797 patent"), 9,339,850 ("the '850 patent"), 10,029,263 ("the '263 patent") 10,029,283 ("the '283 patent"), and 10,065,188 ("the '188 patent") (collectively, the "asserted patents"). Plaintiff Cytonome/ST, LLC ("Plaintiff" or "Cytonome") has asserted claims 1-4, 7-11, 13, and 17-26 of the '528 patent, claims 1-18 of the '295 patent, claims 1-19 of the '797 patent, claims 1-12 of the '850 patent, claims 1, 2, 5-8, and 12-21 of the '263 patent, claims 1, 2, 4-6, and 11 of the '283 patent, and claims 1, 10-12, 15, and 17 of the '188 patent (collectively, the "asserted claims").

NanoCellect contends that each of the asserted claims are invalid under one or more of 35 U.S.C. §§ 101, 102, 103 or 112. NanoCellect reserves its right to supplement these Invalidity Contentions pursuant to the Federal Rules of Civil Procedure, the Court's Local Rules, or any other order or schedule entered by the Court.

I. PRELIMINARY STATEMENT AND RESERVATION OF RIGHTS

NanoCellect makes the following initial invalidity contentions based upon its current knowledge, its current understanding of Plaintiff's initial claim charts pursuant to Paragraph 3(f)(iv) of the Court's Scheduling Order, and its investigations to date. NanoCellect's investigation into the facts of this action is still ongoing. NanoCellect has not completed its investigation of the facts relating to this case, discovery in this action, or its preparation for trial. This disclosure is without prejudice to NanoCellect's right to produce evidence of any additional prior art references. Accordingly, NanoCellect reserves its right to amend, alter or supplement the contentions made herein as new, additional, or different information is learned and discovered.

Further, these contentions, including the accompanying claim charts, were prepared prior to the Court's claim construction ruling and disclosure of claim construction positions from Plaintiff. NanoCellect's positions on the invalidity of particular claims may depend on how the claims are construed by the Court. NanoCellect's contentions herein are not, and should in no way be seen as, admissions or adoptions as to any particular claim scope or construction, or as any admission that any particular element is met in any particular way. NanoCellect objects to any attempt to imply claim construction from the charts attached hereto. In the absence of a claim construction ruling, these contentions are made in the alternative and are not necessarily intended to be consistent with each other. *See* Fed. R. Civ. P. 8(d). These contentions are made out of an abundance of caution to reflect the potential scope of the claims that Plaintiff appears to be advocating or could advocate, as suggested in Plaintiff's initial claim charts. NanoCellect's contentions should not be seen as a suggestion that Plaintiff's reading of the patent claims is correct, and NanoCellect applies the prior art in light of Plaintiff's improper assertion of

infringement and improper application of the asserted claims. NanoCellect reserves the right to supplement or amend the disclosures made herein following disclosure by Plaintiff of its positions regarding claim construction and following receipt of the Court's claim construction order construing the claims of the asserted patents.

The citations provided in NanoCellect's contentions are intended to be exemplary, not exhaustive. NanoCellect has endeavored to cite to the most relevant portions of the identified prior art. Other portions of the identified prior art may additionally disclose, either expressly or inherently, and/or render obvious one or more elements or limitations of the asserted claims. NanoCellect reserves the right to rely on uncited portions of the identified prior art to establish the invalidity of the asserted claims. Moreover, NanoCellect reserves the right to rely on uncited portions of the identified prior art, other art, or testimony to provide context to or aid in understanding the cited portions of the identified prior art. NanoCellect also reserves the right to rely upon treatises, published industry standards, and similar documents to demonstrate the knowledge of one of ordinary skill in the relevant art. Where NanoCellect cites to a particular drawing or figure, the citation encompasses the description of the drawing or figure, as well as any text associated with the drawing or figure. Similarly, where NanoCellect cites to particular text concerning a drawing or figure, the citation encompasses that drawing or figure as well. Also, where NanoCellect cites to any portion of prior art as disclosing a particular limitation, that citation applies with equal force to all similar or identical limitations in each of the asserted claims.

NanoCellect's Invalidity Contentions and the accompanying charts are set forth in the alternative and do not constitute any concession for purposes of determining infringement or any

other issue in this case. *See, e.g.*, *Vanmoor v. Wal-Mart Stores, Inc.*, 201 F.3d 1363, 1366 (Fed. Cir. 2000).

Furthermore, the identification of anticipatory references and obviousness combinations of references provided below under 35 U.S.C. §§ 102 and 103 is merely exemplary and is not intended to be exhaustive. In particular, NanoCellect is currently unaware of the extent to which Plaintiff may contend that limitations of the claims at issue are not disclosed in the art identified by NanoCellect as anticipatory. To the extent that an issue arises with any such limitation, NanoCellect reserves the right to identify other references which make obvious the addition of the allegedly missing limitation to the disclosed system or method. NanoCellect reserves the right to use references identified in obviousness combinations as anticipatory references. NanoCellect reserves the right to use any reference disclosed herein as an anticipatory reference or in an obviousness combination.

Along with these contentions, NanoCellect discloses information as required by the Local Patent Rules. Nevertheless, NanoCellect objects to the disclosure of information that is protected by the attorney-client privilege, the attorney work-product immunity, the common interest privilege or any other applicable privilege or immunity. To the extent that NanoCellect inadvertently discloses information that may be protected from discovery under the attorney-client privilege, the attorney work-product immunity, the common interest privilege or any other applicable privilege or immunity, such inadvertent disclosure does not constitute a waiver of any such privilege or immunity.

By these contentions, NanoCellect does not waive its right to raise different or additional bases for the invalidity of the asserted claims, including under 35 U.S.C. §§ 101 and 112, disclosure of which is not required in these contentions under the Scheduling Order. The

information set forth below is provided without waiving: (1) the right to object to the use of any statement for any purpose, in this action or any other action, on the grounds of privilege, relevance, materiality or any other appropriate grounds; (2) the right to object to any request involving or relating to the subject matter of the statements herein; or (3) the right to revise, correct, supplement or clarify any of the statements provided below at any time. NanoCellect reserves the right to amend and/or supplement these contentions in accordance with the Federal Rules of Civil Procedure and the Rules of this Court.

NanoCellect reserves the right to allege the invalidity of the asserted claims on bases other than those disclosed herein.

II. INCORPORATION BY REFERENCE

In addition to the prior art identified below, NanoCellect incorporates by reference the supporting Exhibits and the prosecution file histories of the patents-in-suit and any related patents or applications, including any arguments, cited prior art, or claim rejections made by the Patent and Trademark Office ("PTO") set forth in such prosecution histories. In addition, NanoCellect incorporates by reference any art listed on the face of the patents-in-suit or any related patents or applications, as well as any art listed on the face of any patents or applications listed as prior art below.

III. PRIOR ART

There is ample prior art demonstrating the invalidity of the patents-in-suit. Exemplary prior art is set forth in this section below and throughout these contentions and the supporting Exhibits. Further, in connection with the contentions set forth herein, NanoCellect may rely, and reserve the right to rely, on common sense and/or the general knowledge of a person of ordinary skill in the art at the time of the alleged inventions.

Each Asserted Claim is invalid for obviousness under 35 U.S.C. §§ 102, 103(a) and/or 112. NanoCellect's statements herein are subject to the Preliminary Statement and Reservation of Rights set forth above.

A. Priority Dates

1. Priority Date of the '528, '295, '797, '263, '850, and '283 Patents

The '528 patent issued from U.S. Application Serial No. 10/179,586, ("the '586 application") which is a continuation of abandoned Provisional Application Serial No. 60/373,256 ("the '256 application"), which was filed on April 17, 2002.

The '295 patent issued from U.S. Application Serial No. 13/245,331, which is a continuation of Application Serial No. 11/433,781 ("the '781 application") filed May 12, 2006, and issued as U.S. Patent 8,210,209 ("the '209 patent"). The '781 application is a continuation of Application Serial No. 11/021,251 ("the '251 application") filed December 21, 2004, and issued as U.S. Patent 7,069,943 ("the '943 patent"). The '251 application is a continuation of the '586 application filed June 24, 2002, and issued as the '528 patent. The '528 patent issued from the '586 application which claims priority from the '256 application filed on April 17, 2002.

The '797 patent issued from U.S. Application Serial No. 13/527,331, which is a continuation of Application Serial No. 11/433,781 ("the '781 application") filed May 12, 2006, and issued as the '209 patent. The '781 application is a continuation of the '251 application filed December 21, 2004, and issued as the '943 patent. The '251 application is a continuation of the '586 application filed June 24, 2002, and issued as the '528 patent. The '528 patent issued from the '586 application which claims priority from the '256 application filed on April 17, 2002.

The '850 patent issued from U.S. Application Serial No. 14/828,238, which is a continuation of Application Serial No. 14/281,303 ("the '303 application") filed May 19, 2014, and issued as U.S. Patent 9,550,215. The '303 application is a continuation of Application Serial No. 13/245,132 ("the '132 application") filed September 26, 2011, and issued as U.S. Patent 8,727,131 ("the '131 patent"). The '132 application is a continuation of Application Serial No. 12/499, 254 ("the '254 application") filed July 8, 2009, and issued as U.S. Patent 8,567,608 ("the

’608 patent”). The ’254 application is a continuation of Application Serial No. 11/101,038 (“the ’038 application”) filed April 6, 2005, and issued as U.S. Patent 7,569,788 (“the ’708 patent”). The ’038 application is a division of Application Serial No. 10/329,008 (“the ’008 application”) filed December 23, 2002, and issued as U.S. Patent 6,976,590 (“the ’590 patent”). The ’008 application claims priority from abandoned Provisional Application Serial No. 60/411,058 (“the ’058 application”) filed September 16, 2002. The ’058 application is a continuation-in-part of Application Serial No. 10/179,488 (the ’488 application”) filed June 24, 2002, and issued as U.S. Patent 6,808,075 (“the ’075 patent”). The ’488 application claims priority from the ’256 application filed on April 17, 2002.

The ’263 patent issued from U.S. Application Serial No. 13/849,365, which is a continuation of Application Serial No. 13/158,960 (“the ’960 application”) filed June 13, 2011, and issued as U.S. Patent 8,408,399 (“the ’399 patent”). The ’960 application is a continuation of Application Serial No. 12/537,802 (“the ’802 application”) filed August 7, 2009, and issued as U.S. Patent 7,963,399 (“the ’3399 patent”). The ’802 application is a continuation of Application Serial No. 11/499,953 (“the ’953 application”) filed August 7, 2006, and issued as U.S. Patent 7,584,857 (“the ’857 patent”). The ’953 application is a continuation of Application Serial No. 10/940,143 (“the ’143 application”) filed September 13, 2004, and issued as U.S. Patent 7,104,405 (“the ’405 patent”). The ’143 application is a division of the ’488 application filed June 24, 2002, and issued as the ’075 patent. The ’488 application claims priority from the ’256 application filed on April 17, 2002.

The ’283 patent issued from U.S. Application Serial No. 14/828,252, which is a continuation of the ’303 application filed May 19, 2014, and issued as U.S. Patent 9,550,215. The ’303 application is a continuation of the ’132 application filed September 26, 2011, and issued as the ’131 patent. The ’132 application is a continuation of the ’254 application filed July 8, 2009, and issued as the ’608 patent. The ’254 application is a continuation of the ’038 application filed April 6, 2005, and issued as the ’708 patent. The ’038 application is a division of the ’008 application filed December 23, 2002, and issued as the ’590 patent. The ’008

application claims priority from the abandoned provisional '058 application filed September 16, 2002. The '058 application is a continuation-in-part of the '488 application filed June 24, 2002, and issued as the '075 patent. The '488 application claims priority from the '256 application filed on April 17, 2002.

Therefore, assuming sufficient disclosure to support a proper priority claim, the earliest possible date of which the '528, '295, '797, '263, '850, and '283 patents could claim benefit is April 17, 2002[1]. For the analysis herein, this date has been used as the priority date of the issued claims. Accordingly, any reference published prior to April 17, 2002, qualifies as prior art to the '528, '295, '797, '263, '850, and '283 patents under 35 U.S.C. § 102(a), and any reference published prior to April 17, 2001 qualifies as prior art to the '528, '295, '797, '263, '850, and '283 patents under 35 U.S.C. § 102(b). References may also be prior art under other pre-AIA section of § 102, such as § 102(e).

2. Priority Date of the '188 Patent

The '188 patent issued from U.S. Application Serial No. 15/042,996, which is a continuation of Application Serial No. 14/517,396 ("the '396 application") filed October 17, 2004, and issued as U.S. Patent 9,260,693. The '396 application is a continuation-in-part of Application Serial No. 14/179,760 ("the '760 application") filed February 13, 2014, and issued as U.S. Patent 9,823,252. The '760 application is a continuation-in-part of Application Serial No. 13/371,277 ("the '277 application") filed February 10, 2012, and issued as U.S. Patent 8,863,962. The '277 application is a continuation of Application Serial No. 13/240,521 ("the '521 application") filed September 22, 2011, and issued as U.S. Patent 8,679,422. The '521 application is a continuation of Application Serial No. 11/800,469 ("the '469 application") filed May 4, 2007, and issued as U.S. Patent 8,123,044. The '469 application claims priority from

[1] Defendant believes the earliest possible priority date is June 23, 2002, because this is the first date on which Plaintiff disclosed a device teaching a "second reservoir" or second "bubble valve." However, Defendant's invalidity contentions rely on references qualifying as prior art under 35 U.S.C. § 102(b) even if the Court determines the earliest possible priority date is April 17, 2002.

abandoned Provisional Application Serial No. 60/798,154 ("the '154 application") filed May 5, 2006. The '154 application is a continuation of Application Serial No. 11/295,183 ("the '183 application") filed December 5, 2005, and issued as U.S. Patent 8,277,764. The '183 application claims priority from abandoned Provisional Application Serial No. 60/633,396 ("the '396 application") filed December 3, 2004.

Therefore, assuming sufficient disclosure to support a proper priority claim, the earliest possible date of which the '188 patent could claim benefit is December 3, 2004. For the analysis herein, this date has been used as the priority date of the issued claims. Accordingly, any reference published prior to December 3, 2004, qualifies as prior art to the '188 patent under 35 U.S.C. § 102(a), and any reference published prior to December 3, 2003 qualifies as prior art to the '188 patent under 35 U.S.C. § 102(b). References may also be prior art under other pre-AIA section of § 102, such as § 102(e).

B. Identification of Prior Art

Pursuant to Paragraph 3(f)(v) of the Scheduling Order, NanoCellect identifies the following prior art references that anticipate and/or render obvious the asserted claims. The following patents and publications are prior art under at least 35 U.S.C. §§ 102(a), (b), (e), (f), and/or (g). Whether a prior art reference anticipates or renders obvious the asserted claims may depend upon claim construction. NanoCellect has identified each prior art patent publication by its number, country of origin, and date of publication and/or date of issue. Each prior art publication is identified by its title, date of publication, and where feasible, author and publisher. For prior art under 35 U.S.C. § 102(b), NanoCellect has identified the item offered for sale or publicly used or known, the date the offer or use took place or the information became known, and the identity of the person or entity which made the use or which made and received the offer, or the person or entity which made the information known or to whom it was made known, to the full extent currently known. For prior art under 35 U.S.C. § 102(f), NanoCellect has identified

the name of the person from whom and the circumstances under which the invention or any part of it was derived, to the full extent currently known. For prior art under 35 U.S.C. § 102(g), NanoCellect has identified the identities of the person or entity involved in and the circumstances surrounding the making of the invention before the asserted patents' applicants, to the full extent currently known. To the extent any prior art reference is found not to anticipate any of the asserted claims or Plaintiff contends that the reference is not anticipatory, NanoCellect contends that the reference nevertheless renders all of the asserted claims obvious either individually or in combination with other references and/or in view of the general knowledge in the art and/or common sense. NanoCellect reserves the right to present additional items of prior art under 35 U.S.C. § 102 or § 103 discovered or otherwise identified or appreciated during the course of discovery or further investigation and also reserve the right to rely on background information, such as but not limited to information contained in dictionaries, handbooks, treatises, encyclopedias, and the like.

1. Prior Art Patents and Patent Publications

NanoCellect contends that the asserted claims are invalid under 35 U.S.C. §§ 102 and/or 103 based on the following prior art patent publications. These patent publications constitute prior art under 35 U.S.C. § 102, and their patent numbers, countries of origin, and dates of publication and/or issue are included on the face of those documents. NanoCellect reserves the right to supplement this list as it learns in the course of discovery of other prior art patent publications that would anticipate and or render the asserted claims obvious. NanoCellect also includes each of the cited references listed in the asserted patents in its identification of prior art.

U.S. Patents and Patent Publications

1. U.S. Patent No. 3,289,687 ("Dunaway"), filed February 13, 1964, and issued December 6, 1966
2. U.S. Patent No. 4,426,451 (Columbus) filed January 28, 1981, and issued January 17, 1984

3. U.S. Patent No. 4,676,274 (“Brown”), filed February 28, 1985, and issued June 30, 1987

4. U.S. Patent No. 4,908,112 (“Pace”), filed June 16, 1988, issued March 30, 1990

5. U.S. Patent No. 5,065,978 (“Albarda et al.”), filed September 19, 1990, and issued November 19, 1991

6. U.S. Patent No. 5,092,972 (“Ghowsi”), filed July 12, 1990, and issued March 3, 1992

7. U.S. Patent No. 5,777,649 (“Otsuka et al.”), filed August 19, 1996, and issued July 7, 1998

8. U.S. Patent No. 5,789,045 (“Wapner et al.”), filed May 10, 1996, and issued August 4, 1998

9. U.S. Patent No. 6,048,734 (“Burns et al.”), filed July 3, 1997, and issued April 11, 2000

10. U.S. Patent No. 6,062,681 (“Field et al.”), filed July 14, 1998, and issued May 16, 2000

11. U.S. Patent No. 6,102,530 (“Kim et al.”), filed January 22, 1999, and issued August 15, 2000

12. U.S. Patent No. 6,152,181 (“Wapner et al.”), filed January 8, 1998, and issued November 28, 2000

13. U.S. Patent No. 6,196,525 (“Ganan-Calvo”), filed November 13, 1998, and issued March 6, 2001

14. U.S. Patent No. 6,273,553 (“Kim et al.”), filed March 24, 2000, and issued August 14, 2001

15. U.S. Patent No. 6,360,775 (“Barth et al.”), filed December 23, 1998, and issued March 26, 2002

16. U.S. Patent No. 6,561,224 (“Cho”), filed February 14, 2002, and issued May 13, 2003

17. U.S. Patent No. 3,370,538 (“ Hines”), February 11, 1966, and issued February 27, 1968

18. U.S. Patent No. 3,508,654 (“Glaettli”), filed February 1, 1967, and issued April 28, 1970

19. U.S. Patent No. 3,560,754 (“Kamentsky”), filed November 17, 1965, and issued February 2, 1971

20. U.S. Patent No. 3,791,517 (“Friedman”), filed March 5, 1973, and issued February 12, 1974

21. U.S. Patent No. 3,827,555 ("Kamentsky et al."), filed March 5, 1973, and issued August 6, 1974

22. U.S. Patent No. 3,984,307 ("Kamentsky et al"), filed August 5, 1974, and issued October 5, 1976

23. U.S. Patent No. 4,153,855 ("Feingold"), filed December 16, 1977, and issued May 8, 1979

24. U.S. Patent No. 4,175,662 ("Zöld 662"), filed March 22, 1978, and issued November 27, 1979

25. U.S. Patent No. 4,581,624 ("O'Connor"), filed March 1, 1984, and issued April 8, 1986

26. U.S. Patent No. 4,636,149 ("Brown"), filed April 29, 1986, and issued January 13, 1987

27. U.S. Patent No. 4,756,427 ("Gohde et al."), filed October 14, 1987, and issued July 12, 1988

28. U.S. Patent No. 5,101,978 ("Marcus"), filed November 27, 1989, and issued April 7, 1992

29. U.S. Patent No. 5,265,327 ("Faris et al."), filed September 16, 1991, and issued November 30, 1993

30. U.S. Patent No. 5,837,200 ("Diessel et al."), filed May 24, 1996, and issued November 17, 1998

31. U.S. Patent No. 5,876,187 ("Afromowitz et al."), filed March 9, 1995, and issued March 2, 1999

32. U.S. Patent No. 5,988,522 ("Glezer et al."), filed June 5, 1997, and issued November 23, 1999

33. U.S. Patent No. 6,033,191 ("Kamper et al."), filed November 19, 1997, and issued March 7, 2000

34. U.S. Patent No. 6,048,328 ("Haller et al."), filed February 2, 1998, and issued April 11, 2000

35. U.S. Patent No. 6,203,291 ("Stemme et al."), filed April 4, 1997, and issued March 20, 2001

36. U.S. Patent No. 6,221,654 ("Quake et al."), filed September 23, 1997, and issued April 24, 2001

37. U.S. Patent No. 6,432,630 ("Blankenstein"), filed December 16, 1999, and issued August 13, 2002

38. U.S. Patent No. 6,592,821 (“Wada et al.”), filed May 10, 2001, and issued July 15, 2003

39. U.S. Patent No. 6,597,438 (“Cabuz et al.”), filed August 2, 2000, and issued July 22, 2003

40. U.S. Patent No. 6,629,820 (“Kornelsen”), filed June 26, 2001, and issued October 7, 2003

41. U.S. Patent No. 6,802,342 (“Fernandes et al.), filed November 26, 2001, and issued October 12, 2004

42. U.S. Patent No. 7,069,943 (“Gilbert et al. ’943”), filed December 21, 2004, and issued July 4, 2006

43. U.S. Patent No. 8,210,209 (“Gilbert et al. ’209”), filed May 12, 2006, and issued July 3, 2012

44. U.S. Patent Publication No. 2006/0278288 (“Gilbert et al. ’288”), filed May 12, 2006, and published December 14, 2006

45. U.S. Patent Publication No. 2002/0166585 (“O’Connor et al. ’585”), filed April 19, 2002, and published November 14, 2002

46. U.S. Patent Publication No. 2012/0015442 (“Gilbert et al. ’442’), filed September 26, 2011, and published January 19, 2012

47. U.S. Patent No. 3,506,654 (“Fried”), filed September 15, 1966, and issued April 14, 1970

48. U.S. Patent No. 3,508,655 (“Kamentsky”), filed February 3, 1967, and issued April 28, 1970

49. U.S. Patent No. 3,906,415 (‘Baker”), filed June 14, 1974, and issued September 16, 1975

50. U.S. Patent No. 3,984,621 (“Propst”), filed September 15, 1975, and issued October 5, 1976

51. U.S. Patent No. 4,050,851 (“Haavik’), filed November 10, 1975, and issued September 27, 1977

52. U.S. Patent No. 4,147,621 (“Giddings”), filed June 28, 1977, and issued April 3, 1979

53. U.S. Patent No. 4,318,483 (“Lombardo et al.”), filed August 20, 1979, and issued March 9, 1982

54. U.S. Patent No. 4,361,400 (“Gray et al.”), filed November 26, 1980, and issued November 30, 1982

55. U.S. Patent No. 4,365,719 (“Kelly”), filed July 6, 1981, and issued December 28, 1982

56. U.S. Patent No. 4,445,696 (“Raj et al.”), filed February 22, 1983, and issued May 1, 1984

57. U.S. Patent No. 4,526,276 (“Shoor et al.”), filed April 28, 1983, and issued July 2, 1985

58. U.S. Patent No. 4,554,427 (“Flick et al.”), filed December 19, 1983, and issued November 19, 1985

59. U.S. Patent No. 4,572,664 (“Hanson”), filed March 28, 1983, and issued February 25, 1986

60. U.S. Patent No. 4,579,173 (“Rosensweig et al.”), filed September 30, 1983, and issued April 1, 1986

61. U.S. Patent No. 4,808,079 (“Crowley et al.”), filed June 8, 1987, and issued February 28, 1989

62. U.S. Patent No. 4,936,465 (“Zöld”), filed September 15, 1989, and issued June 26, 1990

63. U.S. Patent No. 4,939,081 (“Figdor et al.”), filed May 27, 1987, and issued July 3, 1990

64. U.S. Patent No. 5,005,639 (“Leland”), filed April 2, 1990, and issued April 9, 1991

65. U.S. Patent No. 5,030,002 (“North, Jr.”), filed August 11, 1989, and issued July 9, 1991

66. U.S. Patent No. 5,171,132 (“Miyazaki”), filed December 21, 1990, and issued on December 15, 1992

67. U.S. Patent No. 5,193,688 (“Giddings”), filed Ki;u 5, 1991, and issued March 16, 1993

68. U.S. Patent No. 5,213,479 (“Dardis et al.”), filed April 9, 1992, and issued May 25, 1993

69. U.S. Patent No. 5,275,787 (“Yuguchi et al.”), filed August 17, 1992, and issued January 4, 1994

70. U.S. Patent No. 5,395,588 (“North, Jr. et al.”), filed February 19, 1993, and issued March 7, 1995

71. U.S. Patent No. 5,541,072 (Wang et al.”), filed April 18, 1994, and issued July 30, 1996

72. U.S. Patent No. 5,622,831 (“Liberti et al.”), filed June 7, 1995, and issued April 22, 1997

73. U.S. Patent No. 5,637,496 (“Thaler et al.”), filed July 28, 1995, and issued June 10, 1997

74. U.S. Patent No. 5,783,446 (“Saul et al.”), filed March 4, 1996, and issued July 21, 1998

75. U.S. Patent No. 5,795,727 (“Bierre et al.”), filed May 6, 1996, and issued August 18, 1998

76. U.S. Patent No. 5,885,470 (“Parce et al.”), filed April 14, 1997, and issued March23, 1999

77. U.S. Patent No. 5,932,100 (“Yager et al.”), filed June 14, 1996, and issued August 3, 1999

78. U.S. Patent No. 5,976,336 (“Dubrow et al.”), filed April 25, 1997, and issued November 2, 1999

79. U.S. Patent No. 5,979,664 (“Brodeur”), filed August 20, 1998, and issued November 9, 1999

80. U.S. Patent No. 5,998,212 (“Corio et al.”), filed August 26, 1996, and issued December 7, 1999

81. U.S. Patent No. 6,046,056 (“Parce et al.”), filed December 6, 1996, and issued April 4, 2000

82. U.S. Patent No. 6,057,111 (“Deiss et al.”), filed PCT November 12, 1997, and issued May 2, 2000

83. U.S. Patent No. 6,120,666 (“Jacobson et al.”), filed June 16, 1998, and issued September 19, 2000

84. U.S. Patent No. 6,145,247 (“McKinnis”), filed June 27, 1997, and issued November 14, 2000

85. U.S. Patent No. 6,214,556 (“Olek et al.”), filed PCT November 27, 1998, and issued April 10, 2001

86. U.S. Patent No. 6,280,967 (“Ransom et al.”), filed August 5, 1999, and issued August 28, 2001

87. U.S. Patent No. 6,318,970 (“Backhouse”), filed March 12, 1998, and issued November 20, 2001

88. U.S. Patent No. 6,325,114 ("Bevirt"), filed February 1, 2000, and issued December 4, 2001

89. U.S. Patent No. 6,431,212 ("Hayenga et al."), filed October 2, 2000, and issued August 13, 2002

90. U.S. Patent No. 6,454,862 ("Yoshida et al."), filed November 3, 1999, and issued September 24, 2002

91. U.S. Patent No. 6,455,280 ("Edwards et al."), filed December 28, 2000, and issued September 24, 2002

92. U.S. Patent No. 6,481,453 ("O'Connor et al."), filed June 27, 2002, and issued November 19, 2002

93. U.S. Patent No. 6,482,652 ("Furlong et al."), filed March 21, 2001, and issued November 19, 2002

94. U.S. Patent No. 6,524,790 ("Kopf-Sill et al."), filed June 8, 1998, and issued February 25, 2003

95. U.S. Patent No. 6,540,895 ("Spence et al."), filed May 21, 1999, and issued April 1, 2003

96. U.S. Patent No. 6,657,730 ("Pfau et al."), filed January 3, 2002, and issued December 2, 2003

97. U.S. Patent No. 6,739,576 ("O'Connor et al."), filed December 20, 2001, and issued May 25, 2004

98. U.S. Patent No. 6,803,194 ("Keck et al."), filed PCT February 12, 1999, and issued October 12, 2004

99. U.S. Patent No. 6,808,075 ("Bohm et al."), filed June 24, 2002, and issued October 26, 2004

100. U.S. Patent No. 6,821,484 ("Gregersen"), filed PCT September 1, 1999, and issued November 23, 2004

101. U.S. Patent No. 6,976,590 ("Deshpande et al."), filed December 23, 2002, and issued December 20, 2005

102. U.S. Patent No. 7,024,281 ("Unno"), filed December 10, 2001, and issued April 4, 2006

103. U.S. Patent No. 7,075,652 ("Sarvazyan et al."), filed November 12, 2004, and issued July 11, 2006

104. U.S. Patent No. 7,104,405 ("Bohm et al."), filed September 13, 2004, and issued September 12, 2006

105. U.S. Patent No. 7,157,274 ("Bohm et al."), filed September 16, 2003, and issued January 2, 2007

106. U.S. Patent No. 7,157,275 ("Guarino et al."), filed September 26, 2003, and issued January 2, 2007

107. U.S. Patent No. 7,220,594 ("Foster et al."), filed August 4, 2005, and issued May 22, 2007

108. U.S. Patent No. 7,258,774 ("Chou et al."), filed October 2, 2001, and issued August 21, 2007

109. U.S. Patent No. 7,303,727 ("Dubrow et al."), filed February 19, 2003, and issued December 4, 2007

110. U.S. Patent No. 7,389,879 ("Tyvoll et al."), filed January 21, 2004, and issued June 24, 2008

111. U.S. Patent No. 7,452,725 ("Leary et al."), filed January 10, 2003, and issued November 18, 2008

112. U.S. Patent No. 7,497,334 ("Tyvoll et al."), filed December 7, 2007, and issued March 3, 2009

113. U.S. Patent No. 7,569,788 ("Deshpande et al."), filed April 6, 2005, and issued August 4, 2009

114. U.S. Patent No. 7,584,857 ("Bohm et al."), filed August 7, 2006, and issued September 8, 2009

115. U.S. Patent No. 7,820,427 ("Unger et al."), filed September 12, 2006, and issued October 26, 2010

116. U.S. Patent No. 7,863,035 ("Clemens et al."), filed February 15, 2008, and issued January 4, 2011

117. U.S. Patent No. 7,963,399 ("Bohm et al."), filed August 7, 2009, and issued June 21, 2011

118. U.S. Patent No. 8,123,044 ("Johnson et al."), filed May 4, 2007, and issued February 28, 2012

119. U.S. Patent No. 8,252,604 ("Rigler"), filed PCT September 29, 2005, and issued August 28, 2012

120. U.S. Patent No. 8,691,164 ("Butler et al."), filed July 23, 2007, and issued April 8, 2014

121. U.S. Patent No. 8,844,571 ("Golling et al."), filed January 22, 2012, and issued September 30, 2014

122. U.S. Patent No. 8,895,311 ("Handique et al."), filed September 18, 2002, and issued November 25, 2014

123. U.S. Patent Publication No. 2002/0005354 ("Spence et al."), filed August 13, 2001, and published January 17, 2002

124. U.S. Patent Publication No. 2002/0058332 ("Quake et al."), filed September 14, 2001, and published May 16, 2002

125. U.S. Patent Publication No. 2002/0093641 ("Ortyn et al."), filed August 24, 2001, and published July 18, 2002

126. U.S. Patent Publication No. 2003/0027225 ("Wada et al."), filed July 12, 2002, and published February 6, 2003

127. U.S. Patent Publication No. 2004/0037739 ("McNeely et al."), filed March 8, 2002, and published February 26, 2004

128. U.S. Patent Publication No. 2004/0180426 ("Maher et al."), filed February 2, 2004, and published September 16, 2004

129. U.S. Patent Publication No. US 2003/196714 ("Gilbert"), filed June 24, 2002, and published October 23, 2003

130. U.S. Patent Publication No. US 2003/198523 ("Gilbert 2"), filed June 24, 2002, and published October 23, 2003

131. U.S. Patent Publication No. 2004/0233424 ("Lee et al."), filed May 7, 2004, and published November 25, 2004

132. U.S. Patent Publication No. 2006/0170912 ("Mueth et al."), filed February 1, 2005, and published August 3, 2006

133. U.S. Patent Publication No. 2006/0177348 (“Yasuda et al.”), filed February 7, 2006, and published August 10, 2006

134. U.S. Patent Publication No. 2007/0065808 (“Bohm et al.”), filed november 22, 2006, and published March 22, 2007

135. U.S. Patent Publication No. 2008/0070311(“Li”), filed September 19, 2006, and published March 20, 2008

136. U.S. Patent Publication No. 2009/0283452(“Lean et al.”), filed May 13, 2008, and published November 19, 2009

137. U.S. Patent Publication No. 2010/0032350 (“Deshpande et al.”), filed July 8, 2009, and published February 11, 2010

138. U.S. Patent Publication No. 2010/0133151(“Bohm et al.”), filed August 7, 2009, and published June 3, 2010

139. U.S. Patent Publication No. 2011/0005978 (“Bohm et al.”), filed June 23, 2010, and published January 13, 2011

140. U.S. Patent Publication No. 2012/0006727 (“Bohm et al.”), filed June 13, 2011, and published January 12, 2012

141. U.S. Patent Publication No. 2012/0012508 (“Deshpande et al.”), filed September 26, 2011, and published January 19, 2012

142. U.S. Patent Publication No. 2012/0258488 (“Abilez et al.”), filed April 10, 2012, and published October 11, 2012

143. U.S. Patent Publication No. 2013/0083315 (“Lo et al.”), filed August 23, 2012, and published April 4, 2013

144. U.S. Patent No. 2,015,522 (“Hoffman”), filed December 16, 1931, and issued September 24, 1935

145. U.S. Patent No. 2,646,882 (“Frost Jr.”), filed August 2, 1950, and issued July 28, 1953

146. U.S. Patent No. 2,787,453 (“Hibshman et al.”), filed November 30, 1953, and issued April 2, 1957

147. U.S. Patent No. 2,850,940 (“Opperman”), filed April 28, 1955, and issued September 9, 1958

148. U.S. Patent No. 2,923,410 (“Tschmelitsch”), filed April 29, 1957, and issued February 2, 1960

149. U.S. Patent No. 3,362,421 ("Schaffer"), filed May 28, 1963, and issued January 9, 1968

150. U.S. Patent No. 3,370,538 ("Hines et al."), filed February 11, 1966, and issued February 27, 1968

151. U.S. Patent No. 3,495,253 ("Richards"), filed June 26, 1967, and issued February 10, 1970

152. U.S. Patent No. 3,785,390 ("Taylor"), filed July 27, 1970, and issued January 15, 1974

153. U.S. Patent No. 4,284,499 ("Moudgil et al."), filed November 28, 1979, and issued August 18, 1981

154. U.S. Patent No. 4,344,844 ("Townley"), filed March 17, 1981, and issued August 17, 1982

155. U.S. Patent No. 4,863,588 ("Herron"), filed May 26, 1987, and issued September 5, 1989

156. U.S. Patent No. 4,963,498 ("Hillman et al."), filed January 15, 1988, and issued October 16, 1990

157. U.S. Patent No. 5,101,978 ("Marcus"), filed November 27, 1989, and issued April 7, 1992

158. U.S. Patent No. 5,271,724 ("van Lintel"), filed PCT August 21, 1991, and issued December 21, 1993

159. U.S. Patent No. 5,277,556 ("van Lintel"), filed PCT July 3, 1991, and issued January 11, 1994

160. U.S. Patent No. 5,486,335 ("Wilding et al."), filed April 24, 1995, and issued January 23, 1996

161. U.S. Patent No. 5,498,392 ("Wilding et al."), filed September 19, 1994, and issued March 12, 1996

162. U.S. Patent No. 5,617,955 ("Tanner"), filed February 21, 1995, and issued April 8, 1997

163. U.S. Patent No. 5,632,935 ("Yeoman et al."), filed December 28, 1995, and issued May 27, 1997

164. U.S. Patent No. 5,699,157 ("Parce"), filed July 16, 1996, and issued December 16, 1997

165. U.S. Patent No. 5,726,026 ("Wilding et al."), filed November 14, 1994, and issued March 10, 1998

166. U.S. Patent No. 5,726,404 ("Brody"), filed May 31. 1996, and issued March 10, 1998

167. U.S. Patent No. 5,858,195 ("Ramsey"), filed PCT August 1, 1995, and issued January 12, 1999

168. U.S. Patent No. 5,876,187 ("Afromowitz et al."), filed May 9, 1995, and issued March 2, 1999

169. U.S. Patent No. 6,068,752 ("Dubrow et al."), filed August 11, 1999, and issued May 30, 2000

170. U.S. Patent No. 6,086,740 ("Kennedy"), filed October 29, 1998, and issued July 11, 2000

171. U.S. Patent No. 6,120,666 ("Jacobson et al."), filed June 16, 1998, and issued September 19, 2000

172. U.S. Patent No. 6,337,740 ("Parce"), filed August 19, 1999, and issued January 8, 2002

173. U.S. Patent No. 6,507,391 ("Riley et al."), filed August 24, 2001, and issued January 14, 2003

174. U.S. Patent No. 6,532,061 ("Ortyn et al."), filed August 24, 2001, and issued March 11, 2003

175. U.S. Patent No. 6,799,681 ("Warren"), filed February 5, 2002, and issued October 5, 2004

176. U.S. Patent No. 6,830,936 ("Anderson '936"), filed December 31, 2000, and issued December 14, 2004

177. U.S. Patent No. 7,080,664 ("Ayer"), filed May 20, 2005, and issued July 25, 2006

178. U.S. Patent No. 7,118,910 ("Unger et al."), filed November 27, 2002, and issued October 10, 2006

179. U.S. Patent No. 7,355,699 ("Gilbert et al. '699"), filed August 18, 2006, and issued April 8, 2008

180. U.S. Patent No. 7,612,355 ("Wu et al."), filed April 12, 2005, and issued November 3, 2009

181. U.S. Patent No. 7,964,078 ("Lee et al."), filed February 2, 2007, and issued June 21, 2011

182. U.S. Patent No. 8,268,245 ("Wahl"), filed August 26, 2004, and issued September 18, 2012

183. U.S. Patent No. 8,408,399 ("Bohm et al."), filed June 13, 2011, and issued April 2, 2013

184. U.S. Patent No. 8,567,608 ("Deshpande et al."), filed July 8, 2009, and issued October 29, 2013

185. US 8,609,039 ("Zhou et al."), filed December 20, 2011, and issued December 17, 2013

186. U.S. Patent No. 8,623,294 ("Asogawa et al."), filed PCT March 18, 2009, and issued January 7, 2014

187. U.S. Patent No. 8,678,192 ("Pung et al."), filed October 5, 2011, and issued March 25, 2014

188. U.S. Patent No. 8,723,140 ("Kiesel et al."), filed August 9, 2011, and issued May 13, 2014

189. U.S. Patent No. 8,727,131 ("Deshpande et al."), filed September 26, 2011, and issued May 20, 2014

190. U.S. Patent No. 9,074,978 ("Lo et al."), filed July 12, 2012, and issued July 7, 2015

191. U.S. Patent No. 9,149,806 ("Collins"), filed January 10, 2013, and issued October 6, 2015

192. U.S. Patent No. 9,194,786 ("Foster et al."), filed August 1, 2012, and issued November 24, 2015

193. U.S. Patent No. 9,339,850 ("Deshpande et al."), filed August 17, 2015, and issued May 17, 2016

194. U.S. Patent No. 9,448,157 ("Ito"), filed PCT May 31, 2013, and issued September 20, 2016

195. U.S. Patent No. 9,550,215 ("Deshpande et al."), filed May 19, 2014, and issued January 24, 2017

196. U.S. Patent Publication No. 2011/0030808 ("Chiou et al."), filed August 6, 2010, and published February 10, 2011

197. U.S. Patent Publication No. 2012/0153185 ("Ito et al."), filed December 8, 2011, and published June 21, 2012

198. U.S. Patent Publication No. 2014/0251879 ("Deshpande et al."), filed May 19, 2014, and published September 11, 2014

199. U.S. Patent Publication No. 2014/0339445 ("Sharpe et al."), filed March 13, 2014, and published November 20, 2014

200. U.S. Patent Publication No. 2015/0298122 ("Zeng et al."), filed January 27, 2015, and published October 22, 2015

201. U.S. Patent Publication No. 2015/0352597 ("Deshpande et al."), filed August 17, 2015, and published December 10, 2015

202. U.S. Patent Publication No. 2015/0375227 ("Quake et al."), filed January 10, 2014, and published December 31, 2015

203. U.S. Patent Publication No. 2016/0040226 ("Mehta et al."), filed August 11, 2015, and published issued February 11, 2016

204. U.S. Patent Publication No. 2016/0158758 ("Johnson et al."), filed February 12, 2016, and published issued June 9, 2016

205. U.S. Patent No. 2,923,410 ("Tschmelitsch"), filed April 29, 1957, and issued February 2, 1960

206. U.S. Patent No. 5777649 ("Otsuka et al."), filed August 19, 1996, and issued July 7, 1998

207. U.S. Patent No. 6,120,666 ("Jacobson et al."), filed June 16, 1998, and issued September 19, 2000

208. U.S. Patent Publication No. 2008/0213821 ("Liu et al"), filed May 6, 2005, and published September 4, 2008

209. U.S. Patent No. 4,004,150 ("Natelson"), filed May 1, 1975, and issued January 18, 1977

210. U.S. Patent No. 4,478,076 ("Bohrer"), filed September 30, 1982, and issued October 23, 1984

211. U.S. Patent No. 4,478,077 ("Bohrer et al."), filed September 30, 1982, and issued October 23, 1984

212. U.S. Patent No. 4,498,353 ("Kitade"), filed September 27, 1982, and issued February 12, 1985

213. U.S. Patent No. 4,498,780 ("Banno et al."), filed February 2, 1982, and issued February 12, 1985

214. U.S. Patent No. 4,498,782 ("Proctor et al."), filed May 29, 1981, and issued February 12, 1985

215. U.S. Patent No. 4,501,144 ("Higashi et al."), filed September 30, 1982, and issued February 26, 1985

216. U.S. Patent No. 4,560,865 ("Bergstrom"), filed February 28, 1983, and issued December 24, 1985

217. U.S. Patent No. 4,651,564 ("Johnson et al."), filed April 29, 1986, and issued March 24, 1987

218. U.S. Patent No. 4,797,696 ("Allen et al."), filed September 21, 1987, and issued January 10, 1989

219. U.S. Patent No. 4,983,038 ("Ohki et al."), filed April 7, 1988, and issued January 8, 1991

220. U.S. Patent No. 4,987,432 ("Landwehr"), filed September 15, 1989, and issued January 22, 1991

221. U.S. Patent No. 5,050,429 ("Nishimoto et al."), filed February 20, 1990, and issued September 24, 1991

222. U.S. Patent No. 5,082,242 ("Bonne et al."), filed December 27, 1989, and issued January 21, 1992

223. U.S. Patent No. 5,108,623 ("Cangelosi et al."), filed November 19, 1990, and issued April 28, 1992

224. U.S. Patent No. 5,176,358 ("Bonne et al."), filed August 8, 1991, and issued January 5, 1993

225. U.S. Patent No. 5,216,488 ("Tguunanen et al."), filed October 23, 1991, and issued June 1, 1993

226. U.S. Patent No. 5,244,537 ("Ohnstein"), filed September 22, 1992, and issued September 14, 1993

227. U.S. Patent No. 5,307,144 ("Hiroshi et al."), filed December 1, 1992, and issued April 26, 1994

228. U.S. Patent No. 5,323,999 ("Bonne et al."), filed December 1, 1992, and issued June 28, 1994

229. U.S. Patent No. 5,441,597 ("Bonne et al."), filed April 21, 1994, and issued August 15, 1995

230. U.S. Patent No. 5,644,388 ("Maekawa et al."), filed April 19, 1995, and issued July 1, 1997

231. U.S. Patent No. 5,683,159 ("Johnson"), filed January 3, 1997, and issued November 4, 1997

232. U.S. Patent No. 5,716,852 ("Yager et al."), filed March 29, 1996, and issued February 10, 1998

233. U.S. Patent No. 5,726,751 ("Altendorf et al."), filed September 27, 1995, and issued March 10, 1998

234. U.S. Patent No. 5,757,476 ("Nakamoto et al."), filed December 17, 1996, and issued May 26, 1998

235. U.S. Patent No. 5,799,030 ("Brenner"), filed July 26, 1996, and issued August 25, 1998

236. U.S. Patent No. 5,822,170 ("Cabuz et al."), filed October 9, 1997, and issued October 13, 1998

237. U.S. Patent No. 5,836,750 ("Cabuz"), filed October 9, 1997, and issued November 17, 1998

238. U.S. Patent No. 5,851,488 ("Saul et al."), filed February 29, 1996, and issued December 22, 1998

239. U.S. Patent No. 5,863,502 ("Southgate et al."), filed January 23, 1997, and issued January 26, 1999

240. U.S. Patent No. 5,876,266 ("Miller et al."), filed July 15, 1997, and issued March 2, 1999

241. U.S. Patent No. 5,893,722 ("Hibbs-Brenner et al."), filed April 28, 1997, and issued April 13, 1999

242. U.S. Patent No. 5,922,210 ("Brody et al."), filed June 14, 1996, and issued July 13, 1999

243. U.S. Patent No. 5,948,684 ("Weigl et al."), filed July 25, 1997, and issued September 7, 1999

244. U.S. Patent No. 5,971,158 ("Yager et al."), filed June 13, 1997, and issued October 26, 1999

245. U.S. Patent No. 5,972,710 ("Weigl et al."), filed March 31, 1997, and issued October 26, 1999

246. U.S. Patent No. 5,974,867 ("Forster et al."), filed October 30, 1997, and issued November 2, 1999

247. U.S. Patent No. 6,007,775 ("Yager"), filed September 26, 1997, and issued December 28, 1999

248. U.S. Patent No. 6,082,185 ("Saaski"), filed July 25, 1997, and issued July 4, 2000

249. U.S. Patent No. 6,097,485 ("Lievan"), filed March 8, 1999, and issued August 1, 2000

250. U.S. Patent No. 6,103,199 ("Bjornson et al."), filed September 15, 1998, and issued August 15, 2000

251. U.S. Patent No. 6,197,575 ("Griffith et al."), filed March 18, 1999, and issued March 6, 2001

252. U.S. Patent No. 6,221,226 ("Kopf-Sill"), filed October 7, 1999, and issued April 24, 2001

253. U.S. Patent No. 6,316,781 ("Nagle et al."), filed June 16, 2000, and issued November 13, 2001

254. U.S. Patent No. 6,353,475 ("Jensen et al."), filed August 19, 1999, and issued March 5, 2002

255. U.S. Patent No. 6,361,672 ("Zhu et al."), filed July 9, 1999, and issued March 26, 2002

256. U.S. Patent No. 6,440,725 ("Pourahmadi et al."), filed December 24, 1998, and issued August 27, 2002

257. U.S. Patent No. 6,496,260 ("Hafeman et al."), filed December 23, 1998, and issued December 17, 2002

258. U.S. Patent No. 6,504,607 ("Jensen et al."), filed December 4, 2001, and issued January 7, 2003

259. U.S. Patent No. 6,506,609 ("Wada et al."), filed May 11, 2000, and issued January 14, 2003

260. U.S. Patent No. 6,534,011 ("Karthe et al."), filed June 11, 1998, and issued March 18, 2003

261. U.S. Patent No. 6,567,163 ("Sandstrom"), filed August 17, 2000, and issued May 20, 2003

262. U.S. Patent No. 6,602,702 ("McDevitt et al."), filed July 14, 2000, and issued August 5, 2003

263. U.S. Patent No. 6,616,823 ("Kopf-Sill"), filed February 15, 2001, and issued September 9, 2003

264. U.S. Patent No. 6,632,400 ("Brennen et al."), filed June 22, 2000, and issued October 14, 2003

265. U.S. Patent No. 6,649,403 ("McDevitt et al."), filed January 31, 2001, and issued November 18, 2003

266. U.S. Patent No. 6,674,525 ("Bardell et al."), filed April 3, 2002, and issued January 6, 2004

267. U.S. Patent No. 6,703,205 ("Kopf-Sill et al."), filed March 19, 2002, and issued March 9, 2004

268. U.S. Patent No. 6,744,038 ("Wang et al."), filed November 14, 2001, and issued June 1, 2004

269. U.S. Patent No. 6,747,285 ("Schueller et al."), filed November 1, 2001, and issued June 8, 2004

270. U.S. Patent No. 6,756,019 ("Dubrow et al."), filed April 6, 2000, and issued June 29, 2004

271. U.S. Patent No. 6,759,662 ("Li"), filed July 16, 1999, and issued July 6, 2004

272. U.S. Patent No. 6,767,706 ("Quake et al."), filed June 5, 2001, and issued July 27, 2004

273. U.S. Patent No. 6,771,421 ("Rope et al."), filed April 5, 2002, and issued August 3, 2004

274. U.S. Patent No. 6,838,056 ("Foster"), filed July 8, 2002, and issued January 4, 2005

275. U.S. Patent No. 6,930,314 ("Jackson III et al."), October 29, 2001, and issued August 16, 2005

276. U.S. Patent No. 6,980,303 ("Kume et al."), February 1, 2002, and issued December 27, 2005

277. U.S. Patent No. 7,298,478 ("Gilbert et al. '478"), filed August 9, 2004, and issued November 20, 2007

278. U.S. Patent No. 7,312,085 ("Chou et al."), filed April 1, 2003, and issued December 25, 2007

279. U.S. Patent No. 7,476,363 ("Unger et al."), filed May 2, 2004, and issued January 13, 2009

280. U.S. Patent No. 8,277,764 ("Gilbert et al. '764"), filed December 5, 2005, and issued October 2, 2012

281. U.S. Patent No. 9,260,693 ("Johnson et al."), filed October 17, 2014, and issued February 16, 2016

282. U.S. Patent No. 9,757,726 ("Sharpe"), filed March 14, 2013, and issued September 12, 2017

283. U.S. Patent Publication No. 2002/0055167 ("Pourahmadi et al."), filed November 7, 2001, and published May 9, 2002

284. U.S. Patent Publication No. 2002/0071121 ("Ortyn et al."), filed October 12, 2001, and published June 13, 2002

285. U.S. Patent Publication No. 2002/0124896 ("O'Connor et al."), filed April 25, 2002, and published September 12, 2002

286. U.S. Patent Publication No. 2002/0177135 ("Doung et al."), filed July 11, 2001, and published November 28, 2002

287. U.S. Patent Publication No. 2003/0096430 ("Holl et al."), filed October 28, 1999, and published May 22, 2003

288. U.S. Patent Publication No. 2003/0138941 ("Gong et al."), filed October 24, 2002, and published July 24, 2003

289. U.S. Patent Publication No. 2004/0011650 ("Zenhausern et al."), filed July 22, 2002, and published January 22, 2004

290. U.S. Patent Publication No. 2004/0017570 ("Parikh et al."), filed December 30, 2002, and published January 29, 2004

291. U.S. Patent Publication No. 2004/0050866 ("Ingenhoven et al"), filed November 15, 2001, and published March 18, 2004

292. U.S. Patent Publication No. 2004/0086872 ("Childers et al."), filed October 31, 2002, and published May 6, 2004

293. U.S. Patent Publication No. 2004/0115094 ("Gumbrecht et al."), filed March 8, 2002, and published June 17, 2004

294. U.S. Patent Publication No. 2004/0161772 ("Bohm et al."), filed September 16, 2003, and published August 19, 2004

295. U.S. Patent Publication No. 2005/0183995 ("Deshpande et al."), filed April 6, 2005, and published August 25, 2005

296. U.S. Patent Publication No. 2007/0076199 ("Ode"), filed August 30, 2006, and published April 5, 2007

297. U.S. Patent Publication No. 2008/0030865 ("Gilbert et al. '865"), filed October 3, 2007, and published February 7, 2008

298. U.S. Patent Publication No. 2008/0124779 ("Oh et al."), filed October 18, 2006, and published May 29, 2008

299. U.S. Patent Publication No. 2008/0180666 ("Gilbert et al. '666"), filed March 27, 2008, and published July 31, 2008

300. U.S. Patent Publication No. 2008/0182338 ("Abraham-Fuchs et al."), filed November 9, 2006, and published July 31, 2008

301. U.S. Patent Publication No. 2014/0273192 ("Sharpe"), filed March 14, 2013, and published September 18, 2014

302. U.S. Patent Publication No. 2014/0318645 ("Koksal et al."), filed March 14, 2014, and published October 30, 2014

303. U.S. Patent Publication No. 2015/0268244 ("Cho et al."), filed October 15, 2013, and published September 24, 2015

304. U.S. Patent Publication No. 2015/0328637 ("Perrault Jr. et al."), filed May 18, 2015, and published November 19, 2015

Foreign Patents and Patent Publications

1. PCT Publication No. WO 1998/07069 ("Mastrangelo et al."), filed August 11, 1997, and published February 19, 1998

2. European Patent No. 0 177 718 ("Göhde et al."), filed August 20, 1985, and issued December 6, 1989

3. European Patent No. 0 745 682 ("Diessel et al."), filed May 21, 1996, and issued November 11, 2001

4. European Patent No. 1 065 378 ("Unger et al."), filed June 27, 2000, and issued April 3, 2002

5. PCT Publication No. WO 1991/015750 ("Kaye et al."), filed April 8, 1991, and published October 17, 1991

6. PCT Publication No. WO 1998/010267 ("Blankenstein"), filed September 4, 1997, and published March 12, 1998

7. PCT Publication No. WO 00/70080 ("Wada"), filed May 11, 2000, and published November 23, 2000

8. United Kingdom Publication GB 2140128 ("Clow et al."), filed May 19, 1983, and published June 22, 1983

9. United Kingdom Publication GB 2229649 ("Sisak et al."), filed March 30, 1990, and published May 30, 1990

10. Japanese Publication S49-046274 ("JP '274"), filed September 12, 1972, and published May 2, 1974

11. Japanese Publication JP S61-137062 ("Goodo et al."), filed February 15, 1985, and published August 26, 1986

12. Japanese Publication S63-259466 ("Katsuaki et al."), filed April 16, 1987, and published October 26, 1988

13. Japanese Publication H01-170853 ("Enoki et al."), filed December 25, 1987, and published July 5, 1989

14. Japanese Publication H03-043070 ("JP '070"), filed April 2, 1990, and published February 25, 1991

15. Japanese Publication H05-506180 ("Pace), filed March 20, 1990, and published September 16, 1993

16. Japanese Publication H06-507241 ("Corio et al."), filed March 18, 1992, and published August 11, 1994

17. Japanese Publication H08-332074 ("Baiheru et al"), filed May 30, 1996, and published December 17, 1996

18. Japanese Publication H09-141124 ("Yasushi"), filed November 17, 1995, and published June 3, 1997

19. Japanese Publication H11-508182 ("Yager et al."), filed June 14, 1996, and published July 21, 1999

20. Japanese Publication 2001-521755 ("Sitar"), filed October 29, 1998, and published November 13, 2001

21. Japanese Publication 2002-503334 ("Bankenstein"), filed September 4, 1997, and published January 29, 2002

22. Japanese Publication 2004-505272 ("Ornstein et al."), filed August 2, 2001, and published February 19, 2004

23. PCT Publication No. WO 1991/014505 ("Pace"), filed March 20, 1990, and published October 3, 1991

24. PCT Publication No. WO 1998/052691 ("Harrison et al."), filed May 15, 1998, and published November 26, 1998

25. PCT Publication No. WO 2002/010713 ("Cabus et al."), filed August 2, 2001, and published February 7, 2002

26. PCT Publication No. WO 2002/004689 ("Havette et al."), filed July 10, 2001, and published January 17, 2002

27. PCT Publication No. WO 1999/023471 ("Sitar"), filed October 29, 1998, and published May 14, 1999

28. PCT Publication No. WO 2003/089158 ("Deshpande et al."), filed April 17, 2003, and published October 30, 2003

29. German Publication No. 102005054923 ("Klaus et al."), filed November 17, 2005, and published April 12, 2007

30. European Patent No. 0644417 ("Nicks et al."), filed September 13, 1994, and issued May 3, 2000

31. European Publication No. 0793098 ("Masayoshi et al."), filed September 13, 1996, and published September 3, 1997

32. European Patent No. 1001326 ("Dohi et al."), filed May 27, 1999, and issued August 31, 2005

33. French Patent No. 2865145 (“Chatelain et al.”), filed January 19, 2004, and issued February 24, 2006

34. Japanese Publication No. 2001515216 (“Macmillan et al.”), filed August 13, 1998, and published September 18, 2001

35. Japanese Publication No. 2001520377 (“Sea et al.”), filed October 15, 1998, and published October 30, 2001

36. PCT Publication No. WO 02/29106 (“Chou”), filed October 2, 2001, and published April 11, 2002

37. Japanese Patent No. 2001527220 (“Macmillan et al.”), filed December 24, 1998, and issued January 14, 2009

38. Japanese Patent No. 2005-524831 (“Gilbert et al.”), filed April 17, 2003, and issued September 24, 2008

39. Japanese Patent No. 2005-534896 (“Larsen”), filed June 11, 2003, and issued June 15, 2011

40. Japanese Patent No. 2005-521786 (“Jun et al.”), filed July 7, 2003, and issued April 23, 2008

41. PCT Publication No. WO 1995/027199 (Hjelm”), filed March 28, 1995, and published October 12, 1995

42. PCT Publication No. WO 97/02357 (“Anderson”), filed June 27, 1996, and published January 23, 1997

43. PCT Publication No. WO 1999/019717 (“Bjornson et al.”), filed October 15, 1998, and published April 22, 1999

44. PCT Publication No. WO 1999/060397 (“Holl et al.”), filed April 29, 1999, and published November 25, 1999

45. PCT Publication No. WO 2000/006996 (“Li”), filed July 16, 1999, and published February 10, 2000

46. PCT Publication No. WO 2001/002846 (“Melman et al.”), filed June 29, 2000, and published January 11, 2001

47. PCT Publication No. WO 2001/009598 (“Holl et al.”), filed July 28, 2000, and published February 8, 2001

48. PCT Publication No. WO 2001/045843 ("Torres et al."), filed December 20, 2000, and published June 28, 2001

49. PCT Publication No. WO 2003/104772 ("Larsen"), filed June 11, 2003, and published December 18, 2003

50. PCT Publication No. WO 2003/035229 ("Yap et al."), filed October 25, 2002, and published May 1, 2003

51. PCT Publication No. WO 2004/039500 ("Childers et al."), filed October 30, 2003, and published May 13, 2004

52. PCT Publication No. WO 2004/069983 ("Rodgers et al."), filed August 19, 2003, and August 19, 2004

2. Prior Art Publications

NanoCellect contends that the asserted claims are invalid under 35 U.S.C. §§ 102 and/or 103 based on the following published works of prior art. These publications constitute additional prior art under 35 U.S.C. § 102, and their titles, authors, publishers, and dates of publication are included on the face of those documents. In addition to the references listed below, NanoCellect hereby discloses as prior art publications all references disclosed below in Section III.B.3. (regarding on sale/public use), such as press releases, users manuals, and other related documentation about such prior art products. NanoCellect also identifies each of the prior art publications listed on the cover page of the asserted patents. NanoCellect reserves the right to supplement these lists as it learns in the course of discovery of other references, prior art public use, and/or sale that would anticipate and or render the asserted claims obvious.

1. Development of an Electromagnetically Actuated Mercuery Microvalve, Douglas R. Adkins and C. Channy Wong, DSC—vol. 66, Micro-Electro-Mechanical Systems (MEMS)—1998 (ASME 1998), pp. 133-137.

2. LookSmart computer search for "ferrofluid" indicating The Design of a Ferrofluid Magnetic Pipette, Sep. 3, 1998, 3 pages.

3. Magnetic Fluids: Magnetic Forces and Pumping Mechanisms, by Constance Warren Miller, Jan. 1974, cover page and p. 1; 91-109.

4. Microactuation by Continuous Electrowetting Phenomenon and Silicon Deep Rie Process, Junghoon Lee and Chang-Jin "CJ" Kim, DSC—vol. 66, Micro-Electro-Mechanical Systems (MEMS)—1998 (ASME 1998), pp. 475-480.

5. Study of MHD (Magnetohydrodynamic) Micropump, Kazuo Hosokawa, Isao Shimoyama and Hirohumi Miura, Paper No. 92-0446, 199, pp. 205-210, with attached translation (8 pages).

6. The Design of a Ferrofluid-Magnetic Pipet by Nancy E. Greivell, Jun. 1995, cover page and p. 3-5 and 21-56.

7. Design of Microfluidic Sample Preconditioning Systems for Detection of Biological Agents in Environmental Samples, Yager, H. et al., SPIE Proceedings, 3515, 252-259, 1998.

8. Development of a Flow Cytometry Based Miniature Chemical Fluid Analysis System Using Fluorescent Microbeads, M. Huang, et al., SPIE Biomedical Optics, BIOS 97, conference proceedings, 1997.

9. Differential Blood Cell Counts Obtained Using a Microchannel Based Flow Cytometer, E. Altendorf et al., Solid State Sensors & Actuators, vol. 1, 531, 1997.

10. Diffusion-Based Optical Chemical Detection in Silicon Flow Structures, B. Wiegl et al., Analytical Methods & Instrumentation, .mu.TTAS 96 special edition, 1996.

11. Fluorescence Analyte Sensing in Whole Blood Based on Diffusion Separation in Siulicon-Microfabricated Flow Structures, B. Wiegl et al., SPIE Proceedings, J. Loakowitz (ed.), Fluorescence Sensing Technology III, 1997.

12. Fluorescence and Absorbance Analyte Sensing in Whole Blood and Plasma Based on Diffusion Separation in Silicon-Microfabricated Flow Structures (T-Sensors.TM.), B. Wiegl, et al., Biomedical Optics, vol. 6, No. 1, Jul. 1997.

13. Implementation of Novel Optical Detection Methods for Clinically Important Blood Analytes Using Microfabricated Flow Structutes (T-Sensors.TM.), E. Altendorf & B. Weigl, MicroTAS 98, Banff, Canada, Apr. 1998.

14. Integration of Microelectrodes With Etched Microchannels for In-Stream Electrochemical Analysis, R. Darling et al., MicroTAS 98, Banff, Canada, Apr. 1998.

15. Microfabrication Technology for Research and Diagnostics, Silicon Microchannel Optical Flow Cytometry, E. Altendorf et al., SPIE Proceedings, Biomedical Optics 96, Jan. 1996.

16. Microfluidic Approaches to Immunoassays, A. Hatch et al., SPIE conference on Micromachining and Microfabrication Symposium at Santa Clara, CA, Sep. 20-22, 1999.

17. Microfluidic Diffusion Based Electrochemical Detection Using Microfabricated Flow Structutes (T-Sensors.TM.), B. Weigl, Analytical Chemistry, submitted 1999.

18. Microfluidic Diffusion Based Separation and Detection, B. Wiegl & P. Yager, Science, vol. 283, pp. 346-347, Jan. 15, 1999.

19. Optical and Electrochemical Diffusion-Based Detection of Analytes in Complex Samples Using Microfabricated Flow Structures (T-SensorSTM), B. Wiegl, R. Darling, P. Yager, J. Kriebel & K. Mayes, Microand nanofabn'cated electro-optical mechanicalsystems for biomedical and environmental applications II-SPIE vol. 3606, Jan. 25-26, 1999.

20. Rapid Sequential Chemical Analysis Using Multiple Fluorescent Reporter Beads, B. Wiegl et al., .mu.TTAS 96 Conference Proceedings, 1996.

21. Results Obtained Using a Prototype Microfluidics-Based Hematology Analyzer, E. Altendorf et al., SPIE Biomedical Optics 97, 1997.

22. Silicon-Microfabricated Diffusion-Based Optical Chemical Sensor, B. Wiegl & P. Yager, Reprint from "Sensors & Actuators" B 38-39, 452-457, 1997.

23. Simultaneous Self-Referencing Analyte Determination in Complex Samples Solutions Using Microfabricated Flow Structures, (T-Sensors.TM.), B. Weigl et al., Proceedings of MicroTAS 98, 81-4, Banff, Canada, 1998.

24. Whole Blood Assays Using Microfluidics-Based T-SensorSTm Technology, B. Wiegl, Medical Design Online, http://news.medicaldesignonline.com/featuresarticles/19990416-5922.html, Apr. 1999.

25. Cleopatra Cabuz et al., Mesoscopic Sampler Based on 3D Array of Electrostatically Activated Diaphragms, The 10.sup.th Int. Conf. On Solid-State Sensors and Actuators, Transducers '99, Jun. 7-12, 1999, Sendai Japan, p. 1890-1891.

26. Eric Altendorf et al., Results Obtained Using a Prototype Microfluidics-Based Hematology Analyzer, Department of Bioengineering, University of Washington, Box 352141, Seattle, WA 98195, dated prior to Aug. 2, 2000 pp. 73-76.

27. Lehman, J. et al., High-Frequency Modulation Characteristics of Red VCSELs, Electronics Letters, Feb. 13, 1997, vol. 33(4), pp. 298-300, Copyright 1997 IEE.

28. Shapiro, Practical Flow Cytometry, third edition, 1995, p. 237.

29. Strzelecka, E. et al., Parallel Free-Space Optical Interconnect Based on Arrays of Vertical-Cavity Lasers and Detectors with Monolithic Microlenses, Applied Optics, v. 37(14), May 10, 1998, pp. 2811-2821. Copyright 1998 Optical Society of America.

30. T. Ohnstein et al., Micromachined Silicon Microvalve, Proceedings of MEMS, 1990, IEEE Micro Electromechanical Systems, Napa Valley, California, Feb. 11-14, 1990, pp. 95-98.

3. Prior Art Items and/or Knowledge

NanoCellect contends that the asserted claims of the asserted patents are invalid under 35 U.S.C. §§ 102 and/or 103 based on items offered for sale or publicly used or known. NanoCellect incorporates by reference and reserves the right to rely upon any prior art items and/or knowledge disclosed by or referred to in any of the prior art patents or prior art publications identified above in Sections III.B.1. and III.B.2. Because NanoCellect has not yet completed discovery in this case, NanoCellect reserves the right to supplement this disclosure with facts, documents, or other information learned at a later point through third-party discovery or other further investigation.

IV. STATEMENT AS TO ANTICIPATION AND OBVIOUSNESS

Pursuant to Paragraph 3(f)(iv) of the Scheduling Order, below are the grounds on which the claims of the asserted patents are invalid for failure to meet the requirements of both 35 U.S.C. § 102 and 35 U.S.C. § 103. Plaintiff's asserted claims are neither novel nor non-obvious in the field of image sensors.

A. Anticipation of the Asserted Claims

NanoCellect contends the asserted claims are invalid under 35 U.S.C. § 102 as being anticipated by the individual prior art references presented in these contentions. The single items of prior art which anticipate the asserted claims of the asserted patents are cited and described in the claim charts attached hereto as Exhibits A-G. These claim charts provide citations to exemplary portions of the above references, showing how the prior art explicitly discloses every element of the asserted claims. To the extent any element is not provided by an expressly enabling disclosure by the referenced prior art, all elements of the asserted claims would still be the inherent result of putting into practice the devices, systems, and methods described by the prior art referenced herein.

For example, to the extent a prior art reference does not explicitly disclose a flexible membrane bonded to the second plate to seal the first reservoir as required by claim 9 of the ’528 patent, a person of ordinary skill in the art would have understood that the prior art reference inherently discloses this element because of the vast array of flexible materials known in the art at the time of conception.

Also, for example, to the extent a prior art reference does not explicitly disclose an actuator comprising a flexible membrane as required by claim 23 of the ’528 patent, a person of ordinary skill in the art would have understood that the prior art reference inherently discloses this element because of the extensive amount of actuators known in the art at the time of conception such as electrostatic, magnetic, electromagnetic, bimetallic, piezoelectric, shape-memory-alloy based, etc.

Also, for example, to the extent a prior art reference does not explicitly disclose a second reservoir including a gas pocket, wherein compression of the gas facilitates the generating of a pressure pulse as required by claim 10 of the ’295 patent and claim 15 of the ’797 patent, a person of ordinary skill in the art would have understood that the prior art reference inherently discloses this element because of the ample methods well known in the field of microfluidic devices for generating a pressure pulse across the main flow channel such as pressure on a flexible membrane of a reservoir, or chamber, filled with gas or liquid, electrostatic and magnetic actuation systems, piezoelectrical valve systems, and external electronic systems at the time of conception.

Also, for example, to the extent a prior art reference does not explicitly disclose a fluid filled region including a side channel connecting the second reservoir to the flow channel as required by claim 13 of the ’295 patent, a person of ordinary skill in the art would have understood that the prior art reference inherently discloses this element because of the large number of well known arrangements for connecting reservoirs, or chambers, to the main flow channel in microfluidic devices at the time of conception.

Also, for example, to the extent a prior art reference does not explicitly disclose wherein the change in volume or pressure in the second reservoir is a transient change in volume or pressure as required by claim 18 of the ’295 patent, a person of ordinary skill in the art would have understood that the prior art reference inherently discloses this element because it was common to detect and manipulate the flow rate of items in the main channel and the speed of deflection of a particle by using various methods to increase or decrease the volume or pressure in branched reservoirs, or chambers, such as generating a pressure pulse by: (1) flowing liquid from a reservoir into the main channel, (2) flowing gas from a reservoir into the main channel, and (3) using a liquid and gas interface to generate a meniscus and flowing this into the main channel which can all be accomplished at various speeds as desired by a user, including transient, at the time of conception.

Also, for example, to the extent a prior art reference does not explicitly disclose a fluid filled region including a side channel connecting the first reservoir to the flow channel as required by claim 10 of the ’797 patent, a person of ordinary skill in the art would have understood that the prior art reference inherently discloses this element because of the large number of well known arrangements for connecting reservoirs, or chambers, to the main flow channel in microfluidic devices at the time of conception.

Also, for example, to the extent a prior art reference does not explicitly disclose an activating switch component wherein activating the switch component includes flexing the switch component as required by claim 17 of the ’263 patent, a person of ordinary skill in the art would have understood that the prior art reference inherently discloses this element because of the extensive number of flexible materials known in the art at the time of conception.

Also, for example, to the extent a prior art reference does not explicitly disclose a sensor configured to detect a measurement of velocity of the selected particle as required by claim 11 of the ’283 patent, a person of ordinary skill in the art would have understood that the prior art reference inherently discloses this element because of the vast amount of well known velocity capturing detection devices such as video imaging systems that track the particle movement

through a field to determine its relative velocity and multiple point detection systems at various points in the main flow channel to determine its relative velocity at the time of conception.

Also, for example, to the extent a prior art reference does not explicitly disclose a particle processing assembly including a unique identifier as required by claim 11 of the ’188 patent, a person of ordinary skill in the art would have understood that the prior art reference inherently discloses this element because it was common to use a unique identifier to tag particles selected and not selected such as with a bar code, unique number, or particle type at the time of conception.

B. Obviousness of the Asserted Claims

In addition to the discussion above, and to the extent not anticipated, the asserted claims are invalid under 35 U.S.C. § 103 as being obvious to a person having ordinary skill in the art of the relevant technology. In the event a particular prior art reference identified above does not anticipate one of the asserted claims, the reference, alone or in combination with one or more of the other references disclosed herein, renders the claim obvious.

For example, with respect to the ’528 patent, all of the cited references disclose a microchannel with an interior bounded by a side wall. Brown and Chou also each disclose microfluidic valves for regulating the flow of fluid through the microchannel comprising a gas-filled first reservoir and a fluid meniscus interfacing the reservoir and the interior according to claim 1 of the ’528 patent. Chou also at least discloses an actuator for varying the volume of the first reservoir to increase an internal pressure of the first reservoir to vary the flow of fluid through the microchannel and a second reservoir for absorbing a pressure variation in the microchannel induced by the actuator according to claim 1 of the ’528 patent. Combining these elements disclosed in Brown and Chou would have been obvious to a person of ordinary skill in the art.

Also, for example, with respect to the ’528 patent, all of the cited references disclose a channel for conveying a stream of particles in a carrier fluid. Brown and Chou also each disclose a buffer for absorbing the pressure pulse according to claim 18 of the ’528 patent. Chou also at

least discloses an actuator for selectively applying a pressure pulse to the stream to deflect a particle in the stream of particles from the stream of particles according to claim 18 of the ’528 patent. Combining these elements disclosed in Brown and Chou would have been obvious to a person of ordinary skill in the art.

Also, for example, with respect to the ’295 patent, all of the cited references disclose a microfluidic flow channel formed in a substrate and adapted to facilitate analysis or processing of a sample having one or more particles suspended in a suspension medium flowing through the flow channel according to claim 1. Wada, Chou, Marcus and Otsuka also each disclose a first reservoir operatively associated with the flow channel and adapted for dampening or absorbing a pressure pulse propagated across the flow channel according to claim 1 of the ’295 patent. Wada, Chou, and Marcus each disclose a second reservoir operatively associated with the flow channel and adapted for generating the pressure pulse based on a change in volume or pressure in the second reservoir according to claim 1 of the ’295 patent. Moreover, Wada, Chou, and Marcus each disclose a flow channel defining a first aperture for connecting the flow channel relative to the first reservoir and a second aperture for connecting the flow channel relative to the second reservoir, wherein the first aperture is substantially opposite the second aperture according to claim 1 of the ’295 patent. Combining these elements disclosed in Wada, Chou, Marcus, and Otsuka would have been obvious to a person of ordinary skill in the art.

Also, for example, with respect to the ’797 patent, all of the cited references disclose a method for facilitating analysis or processing of a sample comprising flowing a sample through a microfluidic flow channel formed in a substrate according to claim 1. Wada, Chou, and Otsuka also each disclose a method wherein propagating a pressure pulse across the microfluidic flow channel in a crosswise direction and dampening or absorbing the pressure pulse using a first reservoir in fluid communication with the microfluidic flow channel according to claim 1 of the ’797 patent. Wada and Chou each disclose a method wherein the pressure pulse is used to sort one or more particles suspended within the sample according to claim 1 of the ’797 patent.

Combining these elements disclosed in Wada, Chou, and Otsuka would have been obvious to a person of ordinary skill in the art.

Also, for example, with respect to the ’850 patent, Wada, Marcus, Chou, Zöld, and Zöld 662 each disclose a duct for conveying a stream of particles comprising an inlet, and a plurality of outlets including a first outlet and a second outlet, wherein the particles normally from from the inlet to the first outlet according to claim 1. Wada, Marcus, Chou, Zöld, and Zöld 662 each disclose an actuator for selectively applying a pressure pulse to deflect a selected particle in the stream of particles into the second outlet when a predetermined characteristic is detected and a buffer configured to fluidically co-operate with the actuator for absorbing or dampening the pressure pulse to allow other particles in the stream of particles to normally flow into the first outlet while the deflected particle flows into the second outlet according to claim 1 of the ’850 patent. Combining these elements disclosed in Wada, Marcus, Chou, Zöld, and Zöld 662 would have been obvious to a person of ordinary skill in the art.

Also, for example, with respect to the ’263 patent, Wada, Marcus, Chou, Zöld, and Zöld 662 each disclose a first microfluidic flow channel formed in a particle processing component substrate having an upstream inlet configured to introduce a fluidic stream having a plurality of particles into the first microfluidic flow channel and downstream outlets configured to output portions of the fluidic stream of particles and a detection region located downstream of the inlet region configured to allow a particle having a predetermined characteristic to be sensed, the sensed particle being one of the plurality of particles in the fluidic stream according to claim 1. Wada, Chou, Zöld, and Zöld 662 also each disclose a switching device located downstream of the detection region operatively coupled to the first microfluidic flow channel to deliver a transient pressure pulse in a direction substantially perpendicular to a flow direction of the fluidic stream of particles, wherein the transient pressure pulse displaces and separates a selected single sensed particle from the fluidic stream of particles, wherein the selected particle is displaced and separated from the fluidic stream of particles in a switching region, wherein the fluidic stream of unselected particles flows in to a first downstream outlet configured to output a first portion of

the fluidic stream of particles, and wherein the selected particle flows into a second downstream outlet configured to output a second portion of the fluidic stream of particles according to claim 1 of the ’263 patent. Wada discloses a system wherein the transient pressure pulse is not generated downstream of the switching region and wherein the particle processing component substrate includes a reservoir adapted for dampening or absorbing the transient pressure pulse propagated across the microfluidic channel according to claim 1 of the ’263 patent. Combining these elements disclosed in Wada, Marcus, Chou, Zöld, and Zöld 662 would have been obvious to a person of ordinary skill in the art.

Also, for example, with respect to the ’283 patent, Wada, Marcus, Chou, Zöld, and Zöld 662 each disclose a duct configured to convey particles in a stream, the duct including an inlet and a plurality of flow-through outlet channels formed in a substrate according to claim 1. Wada, Chou, Zöld, and Zöld 662 also each disclose an actuator provided on the substrate and associated with the first chamber, the actuator configured to increase a pressure within the first chamber and to discharge an amount of fluid from the first side opening into the duct during a switching operation according to claim 1 of the ’283 patent. Wada also discloses a first chamber formed in the substrate, the first chamber in fluid communication with the duct via a first side opening and otherwise sealed, the first side opening positioned upstream of the plurality of flow-through outlet channels according to claim 1 of the ’283 patent. Combining these elements disclosed in Wada, Marcus, Chou, Zöld, and Zöld 662 would have been obvious to a person of ordinary skill in the art.

Finally, for example, with respect to the ’188 patent, Wada, Gilbert, and Gilbert 2 each disclose a microfluidic chip including at least one microsorter having a switching region and a microfluidic channel formed in the microfluidic chip fluidically coupled to a sample input a keep output, a waste output, and the switching region, wherein the switching region interfaces with at least one actuator external to the microfluidic chip, and wherein the switching region, when actuated by the actuator upon detection of a predetermined characteristic of a selected particle, directs a pressure pulse across the microfluidic channel to deflect the selected particle from the

stream of particles according to claim 1. Combining these elements disclosed in Wada, Gilbert, and Gilbert 2 would have been obvious to a person of ordinary skill in the art.

NanoCellect further believes that no showing of a specific motivation to combine prior art is required to combine the references disclosed above, as each combination of prior art would have no unexpected result, and at most would simply represent a known alternative to one of ordinary skill in the art. *See KSR Int'l Co. v. Teleflex, Inc.,* 550 U.S. 398, 415 (2007) (rejecting Federal Circuit's "rigid" application of teaching, suggestion, or motivation to combine test, instead espousing "expansive and flexible" approach). The Supreme Court held that a person of ordinary skill in the art is "a person of ordinary creativity, not an automaton" and "in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle." *Id.* at 420-21.

Additionally, some of the cited works of prior art cross-reference and discuss one another, further illustrating the close relationship among them and providing further motivation to combine the innovations these references discuss. At most, the claimed inventions of the asserted patents were nothing more than the obvious combination of familiar elements, yielding completely predictable results. If and to the extent Plaintiff challenges the correspondence of any of these references to particular elements of the respective asserted claims, NanoCellect reserves the right to supplement these contentions to identify with additional particularity motivation to combine particular references with one another. NanoCellect may rely upon a subset of combined references depending upon the Court's claim construction and further investigation.

V. CLAIM CHARTS

Pursuant to Paragraph 3(f)(iv) of the Scheduling Order, NanoCellect attaches its claim charts for the asserted patents as Exhibits A-G. The claim charts identify the prior art that anticipates and/or, in combination with other identified prior art, renders obvious the asserted claims and where in each item of prior art each element of the asserted claims is found. These charts are provided for illustrative purposes only and may not set forth every place in every

reference where a claim element is disclosed. In instances where NanoCellect cites to a particular figure in a prior art reference, the citation should be understood to encompass the caption and description of the figure, and any text relating to the figure in addition to the figure itself. Conversely, where a cited portion of text refers to a figure, the citation should be understood to include the figure as well. NanoCellect contends that each identified prior art reference in combination with other identified prior art references or a group of identified prior art references render the asserted claims obvious. To the extent that any prior art reference disclosed in these contentions is not cited in the attached claim chart, NanoCellect also reserves the right to rely on the disclosed references, either alone or in combination with one or more of the other references disclosed herein.

VI. DOCUMENT PRODUCTION

Pursuant to Paragraph 3(f)(iv) of the Scheduling Order, NanoCellect is producing the prior art references identified herein.

Dated: September 20, 2019

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