(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
28 December 2006 (28.12.2006)

PCT

(10) International Publication Number
WO 2006/138257 A2

(51) International Patent Classification:
C12Q 1/68 (2006.01)

(21) International Application Number:
PCT/US2006/022895

(22) International Filing Date: 13 June 2006 (13.06.2006)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/690,771	15 June 2005 (15.06.2005)	US
60/725,116	7 October 2005 (07.10.2005)	US
60/776,415	24 February 2006 (24.02.2006)	US

(71) Applicant *(for all designated States except US)*: **CALLIDA GENOMICS, INC.** [US/US]; 750 North Pastoria Avenue, Sunnyvale, CA 94085 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **DRMANAC, Radoje** [US/US]; 27635 Red Rock Road, Los Altos Hills, CA 94022 (US). **CALLOW, Matthew, J.** [AU/US]; 3 Batten Lane, Redwood City, CA (US). **DRMANAC, Snezana** [US/US]; 27635 Red Rock Road, Los Altos Hills, CA 94022 (US). **HAUSER, Brian, K.** [US/US]; 1005 Virginia Avenue, Campbell, CA 95008 (US). **YEUNG, George** [CN/US]; 102 Magnolia Lane, Mountain View, CA 94043 (US).

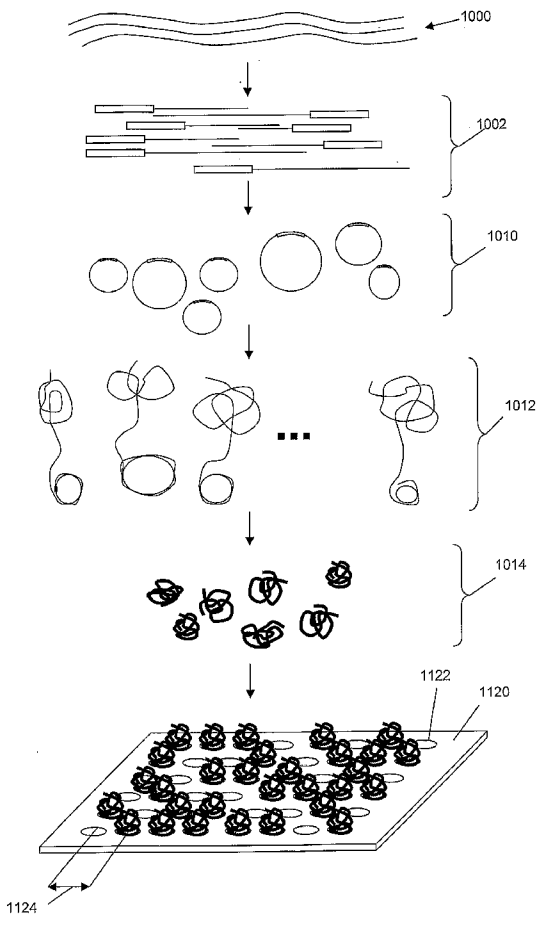
(74) Agent: **MACEVICZ, Stephen, C.**; Complete Genomics, INC., C/O Chief Financial Officer, 750 North Pastoria Avenue, Sunnyvale, CA 94085 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH,

[Continued on next page]

(54) Title: SINGLE MOLECULE ARRAYS FOR GENETIC AND CHEMICAL ANALYSIS



(57) Abstract: Random arrays of single molecules are provided for carrying out large scale analyses, particularly of biomolecules, such as genomic DNA, cDNAs, proteins, and the like. In one aspect, arrays of the invention comprise concatemers of DNA fragments that are randomly disposed on a regular array of discrete spaced apart regions, such that substantially all such regions contain no more than a single concatemer. Preferably, such regions have areas substantially less than 1 μm^2 and have nearest neighbor distances that permit optical resolution of on the order of 10^9 single molecules per cm^2. Many analytical chemistries can be applied to random arrays of the invention, including sequencing by hybridization chemistries, sequencing by synthesis chemistries, SNP detection chemistries, and the like, to greatly expand the scale and potential applications of such techniques.

WO 2006/138257 A2

GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.