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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
19 December 2013 (19.12.2013)

WIPO | PCT

(10) International Publication Number
WO 2013/188857 A3

(51) International Patent Classification:
G01N 21/64 (2006.01)

(21) International Application Number:
PCT/US2013/046035

(22) International Filing Date:
14 June 2013 (14.06.2013)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/660,270 15 June 2012 (15.06.2012) US

(71) Applicant: **LUMINEX CORPORATION** [US/US]; 12212 Technology Blvd., Austin, Texas 78727 (US).

(72) Inventors: **FISHER, Matthew S.**; 1408 Choquette Drive, Austin, Texas 78757 (US). **ARAB, Nicolas**; 1605 Maple Avenue, Austin, Texas 78702 (US).

(74) Agent: **MEYERTONS, HOOD, KIVLIN, KOWERT & GOETZEL, P.C.**; KELLER, John Temple, P.O. Box 398, Austin, Texas 78767-0398 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

[Continued on next page]

(54) Title: APPARATUS, SYSTEM, AND METHOD FOR IMAGE NORMALIZATION USING A GAUSSIAN RESIDUAL OF FIT SELECTION CRITERIA

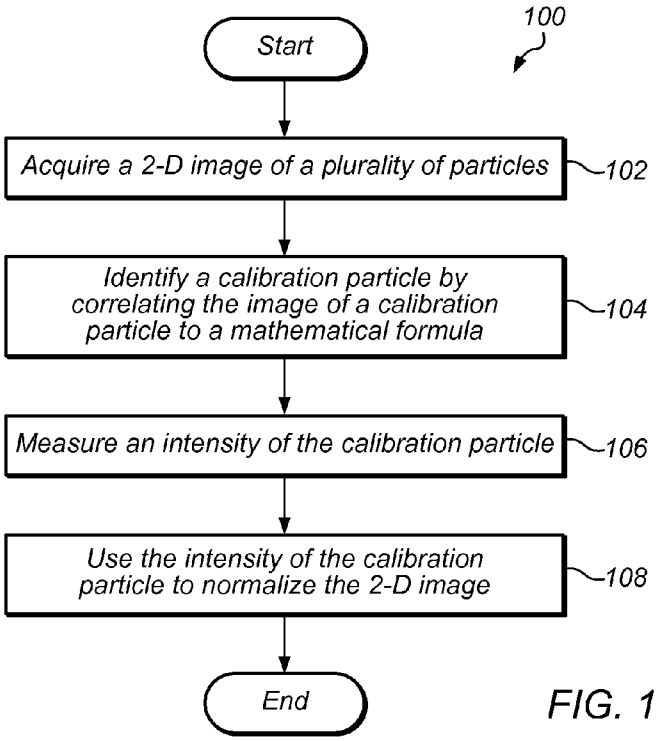

FIG. 1

(57) Abstract: An apparatus and method for image normalization using a Gaussian residual of fit selection criteria. The method may include acquiring a two-dimensional image of a plurality of particles, where the plurality of particles comprises a plurality of calibration particles, and identifying a calibration particle by correlating a portion of the image corresponding to the calibration particle to a mathematical model (e.g. Gaussian fit). The measured intensity of the calibration particle may then be used to normalize the intensity of the image.

WO 2013/188857 A3

WO 2013/188857 A3

(88) Date of publication of the international search report:
13 February 2014

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/046035

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - G01N 21/64 (2013.01)
USPC - 382/128
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - G01N 21/00, 62, 63, 64; G06F 19/00 (2013.01)
USPC - 356/311, 317; 382/128, 133; 702/19, 21, 85

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
CPC - G01N 21/00, 62, 63, 64; G06F 19/00 (2013.01)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PatBase, Google Patents, Google Scholar

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2012/0002882 A1 (ROTH) 05 January 2012 (05.01.2012) entire document	1-22
Y	US 3,824,393 A (BRAIN) 16 July 1974 (16.07.1974) entire document	1-22
Y	US 2010/0285594 A1 (PURVIS, JR.) 11 November 2010 (11.11.2010) entire document	3, 14
Y	US 6,927,401 B1 (PALO) 09 August 2005 (09.08.2005) entire document	7, 18
A	US 2006/0238757 A1 (SILCOTT) 26 October 2006 (26.10.2006) entire document	1-22

☐ Further documents are listed in the continuation of Box C. ☐

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
08 November 2013	29 NOV 2013
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774